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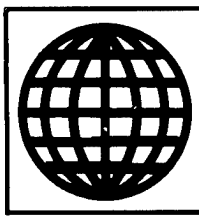

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CONTENTS

On Implementing the Party's Dictates on Promoting Large, Middle-Sized Energy Enterprises

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[Article by Huang Yicheng [7806 3015 6134]: "Conscientiously Adhere to the Spirit of the CPC Central Committee Work Conference, Do Better Work in Large and Medium-Sized Energy Resource Enterprises—Speech at the 1992 National Energy Resource Work Conference (Summary)"]

[Text] The central topics for discussion at this National Energy Resource Work Conference are adhering to and implementing the spirit of the CPC Central Committee Work Conference, summarizing and exchanging experiences over the past several years in looking inward and exploiting potential in all areas of the energy resource industry and improving the "two results" (labor productivity and economic benefits), and studying and proposing policies and measures for doing better work in large and medium-sized energy resource enterprises. Today, I will start by discussing several points for everyone to discuss.

I. The Energy Resource Production and Construction Situation in 1991

In 1991, all cadres and employees on the energy resource battlefront tried to overcome difficulties like weak markets, impeded transportation, enterprise losses, owing huge electricity and coal bills, and other external conditions. They resolutely made stronger management, exploiting internal potential, and increasing the "two results" the focus of work and integrated with the "quality, product variety, results year" activities proposed by the State Council to make rather good achievements in energy resource production and construction. They are manifested mainly in:

A. Stable growth in energy resource production. Preliminary statistics indicate that total production of primary energy resources in China in 1991 may reach 1.04 billion tons of standard coal, the same as in 1990. Because of surging growth in coal output in 1988 and 1989 in conjunction with 2 years of weak markets and an inability to sell coal, as well as reduced output in local and township and town coal mines, projected raw coal output in China in 1991 will be about 1.08 billion tons, basically the same as in 1990. With the economic recovery and growing demand, there was a rather substantial increase in electric power production. Power output in China surpassed 670 billion kWh in 1991, an increase of about 9 percent over 1990 and a higher growth rate than the average level during the Seventh 5-Year Plan. Petroleum and natural gas production also completed or exceeded state plans. Crude oil output reached 139.5 million tons in 1991, up by 0.99 percent over 1990. Natural gas output reached 15.2 billion cubic meters, the same as in 1990.

B. An accelerated pace of energy resource construction. To lay an excellent foundation for achieving the Eighth 5-Year Plan in the energy resource industry, we held operationalization and output attainment mobilization meetings for "two 10,000MW" for electric power and "two 50 million tons" for coal in Shentou and Beijing during 1991, calling for increases of 10,000MW in large and medium-sized installed generating capacity and placing into operation 25 million tons of coal capacity each year in 1991 and 1992, and for focusing on attaining output and increasing output by 50 million tons of coal in currently operating mines during the Eighth 5-Year Plan (an average of 10 million tons each year). With effort, the goals of struggle set forth by the conference were achieved initially. For electric power construction, the state planned to place 6,530MW in large and medium-sized generators into operation during 1991. By the end of the year, a total of more than 10,000MW of large and medium-sized generators had been placed into operation (including 1,220MW in hydropower). When small generators are added, this was the fourth year in succession in which more than 10,000MW of capacity was placed into operation. For coal mine construction, a total of 23 mines were placed into operation during 1991 with a design capacity of 27.14 million tons, which was also the fourth year in a row that the capacity placed into operation surpassed 25 million tons. The completion situation for petroleum and natural gas exploration and development plans was also rather good, with additions of 14.23 million tons and 85,000 cubic meters [as published], respectively, of new extraction capacity added in 1991, both of which were greater than during 1990. In the area of nuclear power construction, Qinshan Nuclear Power Plant, which was designed and built by China itself, entered hot debugging and was successfully connected to the grid and generated power for the first time on 15 December 1991.

What made everyone happy was that several new models came to the fore in the area of reducing construction schedules.

C. New increases in all technical economic indices.

1. In the area of production safety, there was a 24 percent reduction in the death rate per 1 million tons in unified distribution coal mines, which was a many-fold decrease compared to 1987. Major accidents were controlled. If this momentum can be sustained, the goals of struggle for reducing the death rate per 1 million tons originally set for the end of this century may be achieved ahead of schedule either in 1992 or 1993. In a situation of continually increasing installed generating capacity in electric power enterprises and continual expansion of grids, the number of accidents still show a trend toward declining. There was a 7 percent reduction from 1990 to 1991 in the number of accidents that occurred in checks of power generation and supply equipment and more than 80 percent of large and medium-sized power generation and supply enterprises set one or two long-term safety records of going for 100 days without accidents.

2. In the area of raising labor productivity, many electric power bureaus and mining bureaus conscientiously implemented Ministry of Energy Resources stipulations concerning strict organization and streamlined organizations and personnel and made new advances. Full-staff productivity in unified distribution coal mines rose from 1.217 tons/manshift in 1990 to 1.259 tons in 1991. Full-staff labor productivity in electric power enterprises rose from 59,700 per person per year in 1990 to 63,100 yuan in 1991, an

increase of 5.7 percent. Several coal mines and power plants actively conducted experiments and explorations based on the idea of "new methods for new mines (and new power plants)" proposed by the Ministry of Energy Resources.

3. In the area of reducing consumption, electric power enterprises used reinforced management, technical upgrading, rational dispatching, extending large generators supported by small generators to generate more power, and other measures. On the basis of a reduction of 5 g/kWh of standard coal in 1990, coal consumption for power generation in China was reduced by another 3 g in 1991. Consumption of timber and steel per ton of coal in unified distribution coal mines was reduced by 6 percent and over 10 percent, respectively, compared to 1990.

4. In the area of economic diversification, the concern of leaders at all levels made this one focus of the "three main pillars" for the coal and electric power industries and there were substantial developments again in 1991. The value of output from economic diversification in the coal industry reached 10 billion yuan, up 15 percent from 1990. The value of output from economic diversification in the electric power industry reached 7.45 billion yuan, up 16.5 percent from 1990. All of these greatly exceeded the goal of struggle for an average yearly increment of 10 percent.

D. Continued advances in intensive reform and strengthening management. For example, we have continued to intensify "setting levels and attaining objectives in safe and civilized production" activities in large thermal power plants. After five power plants including Tangshan, Liaoning, and others passed inspection and attainment of objectives in 1990, four more power plants at Wangning, Hasan, Zouxian, and Tai'er passed inspection during the first half of 1991 and another group of power plants passed inspection in the last half of the year. The level of mechanization in unified distribution coal mines increased from 65 percent in 1990 to 67 percent, including an increase from 35 percent to 37 percent in the degree of mechanization in fully mechanized mining. Soundness levels of power generation equipment were improved. The average equivalent availability coefficient of 200MW generators was increased from 78.9 percent in 1990 to about 81 percent, which is equivalent to adding 4 billion kWh in power output. In addition, we also made a decision to guarantee the household illumination electricity supplies of urban and rural residents to spur reform of the planned electricity utilization system. We undertook "three fors" activities in rural electrification and focused on rectifying rural electricity prices, which may reduce the unreasonable electricity price burden on peasants by about 1.3 billion yuan, and so on.

However, while we have noted achievements and progress, we must also soberly see the problems and lags that exist. Compared to state requirements and to the levels that we could have attained with effort, the accomplishments we have made still lag substantially behind. The lag is even greater compared to advanced world levels. On the one hand, although the energy resource industry has developed very quickly over the past several years, it still cannot meet requirements. The present overstocks of coal are a temporary phenomenon and it should be said overall that there is not enough coal. We will require an additional 20 million-plus tons of coal for power generation alone each year during the Eighth 5-Year Plan. There are already shortages in electricity supplies and they are especially serious in the Central China, North China, and Northwest China grids. Shutdowns and power restrictions are becoming increasingly frequent and many enterprises in several places are shutting down 3 days and operating 4 days a week because of power shortages. There have been consistent shortages in supplies of petroleum and natural gas. On the other hand, our work internally has not been solid enough. For this reason, we cannot be the least bit complacent but should instead have a sense of crisis and sense of urgency, redouble our efforts, and promote even faster development of the energy resource industry and even faster improvement of the "two results".

II. Raise Understanding, Work at All Levels To Do Better Work in Large and Medium-Sized Energy Resource Enterprises

The CPC Central Committee Work Conference was correct in pointing out that doing better at large and medium-sized enterprises requires that we work in two areas, improving external conditions and exploiting internal potential. Since the establishment of the Ministry of Energy Resources, much work has been done in the area of striving and struggling to improve the external conditions of energy resource enterprises. However, we feel that improvement in the external conditions of enterprises will depend mainly on the state's needs and possibilities and that it is unrealistic to expect to solve them all at once. Moreover, it we do not improve enterprises internally to begin with, it will usually be harder for better external conditions to play a role. For this reason, our work has consistently focused on looking inward, strengthening management, exploiting potential, and improving the "two results" in the 4 years since the Ministry of Energy Resources was established, and we have called upon leaders at all levels to expend their main energies in this area to handle the internal affairs of enterprises well first.

Now, the principle of looking inward, exploiting potential, and improving the "two results" is being accepted by leaders and employees in growing numbers of enterprises who feel that this conforms to the spirit of the CPC Central Committee Work Conference concerning doing well in large and medium-sized enterprises and should be adhered to unwaveringly. Of course, this does not mean that we are already doing very well in this area. Using the six standards and eight requirements proposed at the CPC Central Committee Work Conference, we have not done enough in reforming enterprise internal mechanisms, strengthening technical upgrading and promoting technical progress, implementing decision-making authority in enterprises, and other areas and there is still much work to do. We must do better work in large and medium-sized energy resource enterprises and make efforts in the areas of establishing competitive mechanisms, stimulation mechanisms, and self- restraint mechanisms to turn exploiting internal potential and improving the "two results" into conscious behavior on the part of leaders at all levels and all employees so that work in this area can continually be intensively developed and adhered

to in the long term. For this reason, while we are continuing to adhere to the methods and measures that have been effective over the past several years we should also focus on adopting further measures in these areas:

A. Reinforce technical upgrading, accelerate technical progress. Science and technology are the first force of production. Enterprise strengthening of technical upgrading and accelerating technical progress are important measures and a material and technical foundation for increasing vitality and improving the "two results". The modern energy resource industry, especially the electric power, petroleum, and nuclear industries, are all capital-intensive and technology-intensive industries. The coal industry is no longer a labor-intensive industry that depends on shovels, picks, and drilling holes for blasting. Instead, it is developing toward a technology-intensive industry that is using increasingly greater high and new technology. If we do not strengthen technical upgrading and accelerate technical progress, we will lag further behind advanced world levels and it would be useless to talk of strengthening vitality and improving the "two results".

However, compensation for declining capabilities and aging equipment has depended mainly on capital construction for a long time, in coal mines as well as in electric power enterprises. Advanced properties and backwardness coexist in enterprise technology and equipment. Although the state has made the energy resource industry a focus, its development has never been able to catch up to requirements. This is the result of relying for a long time primarily on the single leg of capital construction to walk. One reason is that understandings only are concerned with capital construction and there is inadequate focus on technical upgrading. A second reason is that depreciation rates for coal and electric power enterprises are too low. The depreciation rate in electric power enterprises, for example, is just 4.2 percent, far below the 7 percent level in the machinery, petrochemical, and other industries, so they are incapable of self-upgrading. A third reason is that serious losses and existing policies in coal mines make it impossible for them to repay technical upgrading loans. We must transform concepts quickly and make technical upgrading and technical progress the order of the day. Not long ago, the Ministry of Energy Resources formulated technical upgrading and technical progress plans for coal and electric power enterprises and submitted a written report to the State Council Production Office, and assistant general manager Zhu Rongji [2612 6954 1015] listened to the report. We suggested that technical upgrading in existing coal and electric power enterprises should be carried out by focusing closely on the objectives of "reduced energy consumption, safety and reliability, improvement and environmental protection, and improving the 'two results'". The focus of technical upgrading in coal mines is upgrading low-efficiency blowers, water pumps, and boilers as well as haulage, hoisting, and other equipment, improving safety conditions, raising mechanization levels in excavation, and improving coal quality and increasing product varieties. The focus of technical upgrading for electric power is carrying out replacement or conversion to heat supplies of existing moderate and low-pressure generators and generators that have exceeded their service lifespans, perfecting and upgrading existing high-pressure generators, especially 200MW generators, and replacing and upgrading low-efficiency auxiliary equipment, blowers, and water pumps to reduce coal consumption for power generation; upgrading power grids in large and medium-sized cities and rural areas to reduce line losses and improve the reliability of electricity supplies; importing and digesting large-scale wind-power generating technology to create the conditions for developing wind power, and so on. To place the energy resource industry in its proper place in the state's key plans, we requested that the state use measures like arranging special loans, increasing depreciation rates, allowing independent accounting based on projects, using results to repay loans, and other measures to provide substantial support. Assistant general manager Zhu Rongji basically confirmed our ideas. He indicated that if the technical upgrading projects we proposed undergo scientific discussion and are truly effective, the Production Office will arrange loans according to projects and provide support. Single-item accounting can be considered for upgrading low-efficiency blowers and water pumps and the income used to repay loans, and the Production Office will lead the way in organizing machinery, energy resource, finance, and other departments to adopt integrated measures for implementation. In particular, leadership of the first group of technical upgrading projects should be strengthened so that they are truly handled well so that excellent results and loan-repayment capabilities gain the trust of banks and lay a foundation for fighting to arrange even more technical upgrading projects in the future.

Working well on technical upgrading and technical progress in old enterprises has a rather substantial impact on improving the "two results" and undoubtedly should be a focus of work. However, we cannot neglect technical progress in new enterprises. This conference also printed and distributed two documents, "New Methods for New Mines" and "New Methods for New Power Plants" for this reason. "New Methods for New Mines (Or New Power Plants)" concerns the need to adopt new technology and equipment adapted to our national conditions, implement new labor organization and fixed personnel standards, and match up with high-quality personnel for newly-built and upgraded coal mines and power plants in the future in order to attain high labor productivity and low production costs, which are called the "two news, two highs, and one reduction".

Moreover, we must pay attention to adopting new technology in energy resource production and construction, implement modernized management methods, and make major efforts to strengthen technology development and scientific research achievement extension work. Recently, the state approved an increase from 0.3 percent to 0.8 percent in the retention rate for technology development expenditures in electric power enterprises. Unified distribution coal mines included among "two guarantees" enterprises are permitted to retain 1 percent of income from sales for technology development expenditures, and these funds must certainly be used properly.

B. Reform enterprise internal mechanisms, implement the principle of distribution according to work. The key to enterprise improvement of the "two results" is fully mobilizing the initiative of people. Motivating the initiative of employees requires combining reinforcement of ideological and political work with actively promoting reform of enterprise internal mechanisms, mainly reform of the personnel, labor, and wage systems and true implementation of the principle of distribution according to work. When we speak of large and medium-sized enterprises properly resolving deep-level problems, the core is the allocation question.

Regarding reform of the personnel, labor, and wage systems in enterprises, the conference also printed and distributed a proposal for everyone to discuss. The overall principle is that reform of the enterprise labor system should involve major efforts to promote optimized labor combinations or rational labor combinations, strengthen the first line of production, reduce surplus personnel, and gradually implement a full-staff labor contract system. Reform of the personnel system concerns eliminating the boundary between "workers" and "cadres", gradually implementing a cadre appoint system, enabling personnel to enter and leave and enabling cadres to move up and down. To encourage enterprises to increase output and reduce personnel, we must further implement the policy of "increasing personnel without increasing total wages, reducing personnel without reducing total wages". As for the personnel left over after staff reductions, they should rely mainly on self-digestion by enterprises and arrangements for developing economic diversification, supporting new mines and new power plants, replacing peasant workers, contractual labor in foreign countries, and other routes. They can also have in-plant training and in-plant waiting for employment to create the conditions for achieving dynamic optimized combinations. Reform of the enterprise wage system should also solve the problems of egalitarianism and "eating from the big common pot", and truly implement the principle of distribution according to labor. Advocate the implementation of an allocation system centered on post technical ability wages. Every effort should be made to implement piece-rate wages for job categories and posts having the proper conditions and the wage allocation differentials for different posts should be pulled further apart for a true slant toward first-line production posts, especially high-tech, arduous, dirty, repetitive, and dangerous ones.

Achieving the principle of distribution according to labor is not a very easy matter and it requires much arduous and detailed work. We are preparing to select a group of enterprises to conduct trials during 1992 and we hope that the relevant units will coordinate closely, actively experiment and explore, make timely summaries of experiences, and continually perfect and develop.

C. Reinforce employee training, improve personnel quality. Comrade Jiang Zemin pointed out in his speech at the CPC Central Committee Work Conference that "economic development must depend on S&T progress and improvement in the quality of laborers". This is also entirely appropriate for energy resource enterprises. As I understand it, improving the quality of laborers also includes improving the quality of leading cadres, management personnel, and engineering and technical personnel in enterprises. This is the most important basic condition for running enterprises properly. Regardless of the industry, all must make comprehensive improvement in the quality of personnel a basic focus in running enterprises well. We should be working on these areas at present:

1. Change from recruiting workers to recruiting students for technical job categories and rely mainly on training and transfers by technical schools and polytechnical schools. Operating and maintenance personnel for several types of important equipment like fully mechanized mining equipment drivers and operating shift personnel for 200MW and larger generators should have professional school and higher degrees and they should undergo actual operational training and qualifications testing before taking their posts.

2. Reinforce job post training for existing on-the-job personnel. There is a universal problem of too many people in enterprises now and they should make the decision to select about one-fifth of their personnel each year and take them off the job for rotating training and evaluations to take over job positions. They should be willing to spend money to improve training and equipment conditions. Where will the funds come from? Old plants can take the route of technical upgrading and new plants can include it in capital construction investments.

3. We should adopt the corresponding policies and measures and establish effective mechanisms to encourage employees to study culture and technology and to improve their labor skills and professional levels. This mainly involves establishing strict testing and promotion systems and truly linking them to distribution according to labor.

Improving the quality of enterprise leading cadres is in a certain sense even more important. As bureau directors, mine managers, and plant managers, beside needing to conscientiously study political theory and continue to raise their levels of Marxism-Leninism, they should also strive to study modern S&T knowledge and study modernized administration and management professions to be able to better satisfy enterprise requirements. In this area, we should also study the adoption of measures to establish truly realistic enterprise leading cadre training and evaluation systems.

D. Implement objective and cost management and "internal banks", mobilize the employees and masses to manage financial affairs. We set forth this question at the 1990 National Energy Resource Work Conference and the Ministry of Energy Resources has printed and distributed documents. The situation in practice over the past several years shows that there are significant improvements in economic results in every case where this has been done conscientiously. However, most enterprises at present pay insufficient attention to objective and cost management and their consciousness of management is rather weak. Although some enterprises have established "internal banks", there are still mainly playing the role of finance capital and have not performed the function of accounting centers. We must conscientiously focus on this area in 1992, so we have also printed and distributed a document that makes a renewed call for strengthening organization and cost management

and for using the division of cost indices by levels, contractual responsibility by levels, and internal banking and accounting, and which links them closely with individual employee income to truly mobilize the masses to manage financial affairs and establish economic results mechanisms that everyone shows concern for.

E. Further intensify reform, implement enterprise decision making rights. Practice has proven that this is a very important condition for running large and medium-sized enterprises properly. We should continue adhering to this principle in the future and use intensive reform to further implement enterprise decision making rights.

1. Conscientiously implement State Council stipulations, cease all unnecessary inspections and evaluations of enterprises. I have clearly announced in this regard that starting in 1992, with the exception of major safety inspections, examinations of standards attainment for coal mine quality standardization and modernized construction, inspections of "dual index standards" in thermal power plants, and standards attainment inspections for the "three fors" in rural electrification work, the ministry should conduct no other inspections and evaluations of enterprises.

There are too many meetings now, which is also a great burden on enterprises. To enable leading comrades in enterprises to concentrate their efforts on reform, exploiting potential, and improving results, there should be strict controls over meetings in the future and no unessential meetings should be held. In particular, there should be fewer specialized meetings held in the relevant departments and bureaus of ministry organizations and in the China Electric Power Association. Requests for participation by electric power and coal department and bureau directors in meetings should receive approval by ministry leaders.

2. Conscientiously adhere to the "Enterprise Law", further implement enterprise decision making rights in the areas of administrative decision making, organizational establishment, labor utilization, cadre hiring and firing, and internal allocation. As government departments, they only carry out macro control, guidance, and supervision in areas like planning, policies, laws and regulations, and so on and do not get directly involved internally in enterprises. It the future, we must further reinforce the concept of running mines and plants according to law, strengthen legislative work and enterprise legal services work, and learn how to apply legal weapons to protect the legitimate rights and interests of enterprises.

3. Perfect the contractual administrative responsibility system. Based on the characteristics of coal mines and successful experiences at the Capital Iron and Steel Works, it is best to have a 10-year term for contractual responsibility. Implementing full contractual responsibility at one time based on price indices and rational coefficients so that everything is known in advance will give enterprises greater initiative rights and decision making rights. Contractual responsibility in petroleum and electric power enterprises should also provide 10-year advance notice.

4. Reform the capital construction system in unified distribution coal mines. Capital construction in unified distribution coal mines at present basically means that whatever Beijing says goes, even to the extent of managing unit projects and tunnels. Construction rights should be transferred to mining bureaus, with the state controlling only deployments, scales, investments, and designs while mining bureaus handle construction and they should be responsible for providing production capacity on schedule. This would aid unification of responsibilities, reduce disputes, accelerate construction, and conserve investments.

5. Work on trials of enterprise groups. The State Council has already issued a formal document in which the state will organize 55 intensive-type enterprise groups, among them seven energy resource enterprises including the five large North China, Northeast China, East China, Central China, and Northwest China integrated electric power companies as well as the Huaneng Group and East China Coal Company. Relevant departments of the State Council are now formulating concrete methods regarding how to conduct the trials and the ministry has also made special research deployments.

III. Inspire Enthusiasm, Strive To Complete Energy Resource Production and Construction Tasks for 1992

The National Planning Conference held not long ago made an initial determination of the main indices for national economic development plans for 1992. For the energy resource industry, based on the preliminary arrangements made by the State Planning Commission, the plan indices for energy resource production in 1992 are: total output of primary energy resources in China should reach 1.057 billion tons of standard coal, up 1.9 percent over 1991, including 1.1 billion tons of raw coal output, up by 2.3 percent; 140.5 million tons of crude oil output, up by 0.9 percent; 15.7 billion cubic meters of natural gas output, up by 1.9 percent; and 700 billion kWh of electricity, up by 5.1 percent. In the area of energy resource construction, plans for 1992 call for placing 11 coal mines into operation with a design capacity of 20.8 million tons and placing 8,620MW of large and medium-sized generators into operation, including 2,070MW of hydropower.

We feel that to ensure that the national economy can maintain an appropriate rate of growth, the plan indices listed above must be exceeded in coal, oil, and electricity. The goals of struggle proposed by the Ministry of Energy Resources for 1992 are: national electricity output should reach 710 billion kW and added production capacity should strive to achieve the requirements proposed at the "Two 10,000MW" and "Two 50 Million Tons" Mobilization Meetings, meaning that an additional 10,000MW in large and medium-sized generators and at least 23 million tons in new production capacity at coal mines should be placed into operation during 1992. We originally proposed that output in unified distribution coal mines should increase by 20 million tons over the 10 years to the end of this century, including 13 million tons in the China Unified Distribution Coal Mine Company and 5 million tons in the East China Coal Company. We should strive to achieve this goal of struggle during 1992. We should also strive to achieve the

goal of struggle of increasing petroleum output by an average of 2 million tons a year. At the same time, we should continue to resolutely exploit internal potential, improve the "two results", and complete all indices proposed by the Ministry of Energy Resources CPC Group, meaning a 5 percent increase in labor productivity in unified distribution coal mines to reach full-staff productivity to 13,000 tons/manshift; reducing the death rate per 1 million tons to less than 1.1 persons and striving to reduce it to less than 1 person during 1992 or 1993; reducing materials consumption by 2 to 3 percent; and striving for further reductions with no increase in comparable costs over 1991. Labor productivity in electric power enterprises should be increased by more than 5.5 percent and there should be an additional reduction of 5 grams of standard coal in the amount of coal consumed to generate electricity. The value of output from economic diversification in coal and electric power enterprises should be increased by more than 10 percent.

The 8th Plenum of the 13th CPC Central Committee held not long ago made the "Decision Concerning Further Reinforcement of Agricultural and Rural Work" that called on all industries and all sectors to make major efforts to support agricultural and rural economic development. The "Decision" also clearly pointed out that we must accelerate rural hydropower construction and other energy resource development and accelerate construction of rural power grids and preliminary electrification in rural areas to achieve electricity supplies to every county in China by the end of this century. Our energy resource departments, especially electric power departments, must conscientiously implement this. China still has 28 counties with no electricity and a population of about 170 million people without electricity. We should adopt measures adapted to local conditions in a planned manner to gradually solve this problem. We must solve the electricity supply problems of four or five counties without electricity and some regions having concentrated populations without electricity during 1992. We should also continue intensively developing "three fors" activities in rural electrification with a focus on guaranteeing supplies of electricity for household illumination for urban and rural residents and on work to rectify rural electricity prices and reduce the burden on peasants.

Overall, the tasks facing the energy resource industry in 1992 are relatively numerous. We must complete and surpass energy resource production and construction plans for 1992 and make greater progress in reinforcing technical upgrading, reforming internal mechanisms, strengthening enterprise management, and other areas so that even greater accomplishments are made in exploiting internal potential and improving the "two results". This requires leaders at all levels to make even more arduous efforts, overcame difficulties in advancing, and creatively do all items of work well. Here, I would like to stress three points.

First, inspire enthusiasm, advance despite difficulties, stand on our own feet and become stronger. It should be affirmed that major advances have been made in all energy resource sectors over the past several years and all energy resource sectors are now facing difficulties in the area of external conditions, no fewer than in other industries. Although the state has made major efforts at aiding improvement, they are restricted by financial abilities and many other complex factors so it will be hard to make a significant improvement in the short term. All of these things are facts that exist objectively. We certainly cannot be satisfied because we have made a few achievements or advances, nor can we constantly complain of hardship or suffering and hesitate to press forward when facing difficulties. Instead, we must advance despite difficulties, stand on our own feet and become stronger, and boldly create a new situation. We must have a good spiritual state. Experience has shown that the differences in work in each unit in similar circumstances are determined largely by the spiritual state of the leading cadres in this unit. To better complete the energy resource production construction and reform tasks, our leading comrades at all levels must first of all have a good spiritual state and use our work to inspire all employees to advance despite difficulties and continually create a new situation.

Second, make efforts to assist lagging enterprises to improve their situations. "Grasping the two heads to lead the middle" is one effective work method the CPC has consistently advocated. Coexistence of the advanced and the backward is an inevitable result of the uneven development of things. At present, advanced units among energy resource enterprises, especially coal and electric power enterprises that are doing good work in all areas and making prominent achievements are in the minority. Lagging units with relatively poor work and no changes for years in their circumstances are also in the minority. All are in a situation of two small heads and a big middle. In the past, we did a great deal of work in establishing advanced examples and summarizing and extending advanced experiences. This was completely necessary and truly played a substantial demonstration and promotion role. We should also continue to strengthen work in this area in the future, immediately discover and summarize fresh experiences created by the masses, and make major efforts to propagandize and extend them. "A fine example has boundless power." Establishing advanced examples and extending advanced experiences to stimulate those lagging and leading the regular should still be an important pattern and slant in our development work. Newspapers in our industry should play a greater role in this area.

However, we cannot neglect assistance to lagging enterprises in studying the advanced and catching up with the advanced and trying to change their situations quickly. We have done a great deal of work in this area over the past several years. Overall, however, we have not concentrated enough on assisting lagging enterprises. I hope that all corporations, all coal management bureaus and mining bureaus, and all electricity management bureaus and electric power bureaus will make more efforts in this area in the future. We must conscientiously analyze the current situation in enterprises under our jurisdiction, line up enterprises, and carefully study the individual characteristics and problems that exist in lagging enterprises to help in targeted adoption of measures for improvement. Those with real difficulties should be assisted in resolving real difficulties and those with improper leadership organizations should readjust and

strengthen them. Every bureau and company should select one or two points, assign guidance groups or groups of cadres who stay at selected grass-roots units to help improve their work and gain firsthand experience for guiding overall work and, in accordance with the principle of "helping, not replacing", assist and promote them, rely mainly on enterprises to stand on their own feet and become stronger, and change the situation as quickly as possible.

Third, reinforce ideological and political work, rely wholeheartedly on the working class. This is the political advantage of our party and a fundamental guarantee for running enterprises well and doing good economic work. Everyone has a great understanding of the importance of reinforcing ideological and political work. All sectors of the energy resource industry have done a great deal of work in this area over the past several years and made substantial achievements. As for ideological and political work during 1992, all corporations have studied or are now studying deployments and the ministry is also planning specialized research deployments, so I will not discuss them further today and will only address a few concrete issues.

1. The question of strengthening study by leaders and cadres at all levels. In his speech to the CPC Central Committee Work Conference, general secretary Jiang Zeming emphasized while discussing improvement of leadership work that leading cadres should certainly reinforce their study of Marxist theory and strengthen their political study, they should be adept at political observations and handling problems, and they should be adept at applying the Marxist world view and methodology in formulating and implementing correct policies in order to raise political levels and improve leadership capabilities. This is extremely important for us in running enterprises properly and doing all items of work well. Study by leading cadres should of course mainly involve self-study and rely mainly on reinforcing the consciousness of study. However, party organizations at all levels should focus conscientiously on each other, with one level focusing on one level and one level supervising one level. They should be resolved to give leading cadres at all levels opportunities to participate in study at party schools and cadre schools.

2. The question of strengthening construction of honest government. The CPC Central Committee also issued a special document recently that sets forth clear stipulations regarding the questions of using public funds for guests and holding big banquets and we must resolutely implement them 100 percent. I want to reiterate here that in the future, when ministers, vice ministers, department and bureau directors, and ministry cadres go down on official business, they all must eat with workers and are not permitted to request banquets for any reason. In addition, every effort should be made to arrange for them to stay in hostels. Violations must certainly be severely punished. This point must be conscientiously implemented from top to bottom, with mutual supervision. Of course, using public funds for banquets is just one aspect of improper working styles but it has an extremely great impact on the relations between the party and the masses and between cadres and the masses and must be dealt with conscientiously. If this problem is not resolved, it will be meaningless to talk of correcting improper working styles and eliminating corruption.

3. The question of mobilizing and relying on employees and the masses. The working class including intellectuals are the masters of state-run enterprises. If we wish to intensify reform, strictly manage plants (and mines), exploit internal potential, and improve the "two results", all these things require that we fully foster the initiative and creativity of all employees and the masses. To carry out this point, moreover, we must rely on intensive ideological education of employees in patriotism, collectivism, and socialism and reinforce their sense of being responsible masters. We must rely on implementation of distribution according to labor and be concerned with the hardships of employees and the masses. We must also rely on reinforcing democratic management of enterprises and fostering the role of workers' congresses. In particular, programs for internal reform in enterprises should be discussed and passed by workers' congresses so that employees truly serve as masters of the house.

During the first 10 years of reform and opening up, we have adhered to one core and two basic points. Economic construction has gone pretty well and we are confident that things will go even better during the next 10 years. If we continually study and strive to work under the leadership of the CPC Central Committee with comrade Jiang Zeming as its core, spend less time on idle talk and handle more matters, we will welcome the victorious convening of the 14th CPC Congress in the new year with new and greater accomplishments!

Offshore Oil Lures Foreign Funds

40100036A Beijing CHINA DAILY (Economics and Business) in English 11 Apr 92 p 2

[Article by staff reporter Chang Weimin]

[Text] The China National Offshore Oil Corporation (Cnooc) signed a contract yesterday in Sydney with an Australian firm on joint petroleum prospecting in the South China Sea.

According to the contract, the Ampolex (Orient) Inc., a subsidiary of Ampolex Ltd. of Australia will join hands with Cnooc to prospect an oil-bearing area in the Pearl River mouth basin.

The contract area, called 17-22 where water is 400 metres in depth, covers 120 square kilometres.

The Australian firm, which has for years co-operated with Cnooc in petroleum prospecting and development in China, is also to spend $21 million to further assess an oilfield, called Lufeng 22-1, in the area.

The appraisals are to be conducted on three aspects—geological, engineering and economic, with a decision then to be made on whether the oilfield is worth developing.

Wang Yan, Cnooc's standing executive vice-president who arrived in Australia on April 4, signed the contract on behalf of Cnooc.

In Melbourne on April 7, Wang signed another contract with representatives of the BHP Petroleum (China) Inc., a subsidiary of BHP Petroleum Pty Ltd. of Australia, and the Texaco Petroleum Maatschappij (Nederland) B V, a subsidiary of Texaco Inc. of the United States.

The three firms are to conduct petroleum prospecting in an oil-bearing area, called 11-19, in the Bohai Gulf.

The contract term was set at seven years.

The two foreign firms had studied the results of Cnooc-conducted seismic prospecting of the area before they made their decision.

This contract area covers 5,600 square kilometres.

BHP has invested in several petroleum prospecting and development projects in China. It took part in 11-month-long joint studies, beginning in December, 1990, with Cnooc on the southern part of the Bohai Gulf.

As the operator for the studies, BHP spent some $680,000.

Cnooc officials said the two contracts represent their firm's determination to expand co-operation with foreigners.

At present, several contracts are under implementation in the Bohai Gulf by Cnooc and companies from Japan, the United States, Britain, Australia and Norway.

The French Total and Elf companies had participated in petroleum prospecting and development in the Bohai Gulf.

Latest statistics show that Cnooc has utilized at least $3.1 billion of foreign investment since 1982 when it started operation.

With help from foreign firms, Cnooc has discovered and verified 67 petroleum-bearing structures in the South China Sea and the Bohai Gulf.

Reserves of at least 870 million tons of oil and 133 billion cubic metres of natural gas have been discovered.

Some foreign firms have already profited from offshore petroleum development in China.

Last year, 2.4 million tons of crude oil were produced in Chinese offshore fields, compared with 1.24 million in 1990 and 0.98 million in 1989.

Cnooc officials said present progress shows that annual production will "almost surely" surpass 8 million tons in the year 1997.

However, they said it will be difficult to keep that output after 1997.

China's Strategy in Dealing With Energy Issues in Asian, Pacific Economic Cooperation

926B0054A Beijing ZHONGGUO NENGYUAN [ENERGY OF CHINA] in Chinese No 12, 25 Dec 91 pp 10-13

[Article by Wang Zengchuan [3769 5174 0356]]

[Text] **Part I**

Characteristics of Energy Situation in Asian Pacific Region

(1) Energy demand in the Asian Pacific region is growing rapidly. Currently, the region has a shortage of energy and cannot achieve self-reliance in energy. According to statistics in the 1990 ASIAN PACIFIC REVIEW, energy production in the Asian Pacific region is only 16 percent of the world's production but the region consumes 20 percent of the world's energy. Based on "Asian Pacific Statistical Annuals" of the United Nations, in the 23-year period from 1965 to 1988, energy consumption in 42 countries and regions, excluding the United States and Canada, rose from 708 million tons of coal equivalent to 2.16 billion tons of coal equivalent. Over the same period, the production of energy rose from only 680 million tons of coal equivalent to 2.04 billion tons of coal equivalent; energy imports increased year after year. Energy imports were 28 million tons in 1965 and 112 million tons in 1988, an increase of four-fold. If the United States is included, then the shortfall of energy in the Asian Pacific region in 1988 was as high as 540 million tons of standard coal. The reliance on imported oil was even greater. Seventy percent of the oil consumed by Japan, 50 percent of the oil consumed in the United States, and 73 percent of the oil used in the entire Asian Pacific region was imported.

(2) The energy consumption structure of the Asian Pacific region is irrational; too much emphasis is placed on solid fuel and a number of countries rely greatly on biological energy such as firewood. In 1988, the region consumed more than 50 percent solid fuel. Among the developing countries in the region, the ratio of solid fuel was 61 percent. The consumption of noncommercial energy was very high in the region, in some countries 80 percent of the energy came from biological energy such as firewood and sugarcane waste. According to the United Nations "Energy Statistics Annuals," the world consumed 1.698 billion cubic meters of firewood and 240 million tons of sugarcane waste; in the Asian Pacific region these figures were respectively 740 million cubic meters and 79 million tons, or 43.78 percent and 33.05 percent of the noncommercial energy consumed in the world.

(3) Developed nations rely heavily on imported energy. The 1988 United Nations "Energy Statistics Annuals" showed that in 1988 the United States, Japan, South Korea, Thailand, and the Philippines were all net energy importers. The United States imported 429 million tons of standard coal, Japan imported 450 million tons, South Korea imported 77.83 million tons. Thailand imported 16.477 million tons, and the Philippines imported 16.631 million tons of standard coal.

Reasons for the Energy Characteristics in Asian Pacific Region

(1) The economic development in the Asian Pacific region has been very rapid. The high rate of economic development naturally caused a rapid growth in the demand for energy. Statistics showed that between 1965 and 1973 the annual rate of growth of the gross value of production in developed countries was 4.7 percent. In the same period, the growth in the Asian Pacific region, including Singapore, Taiwan,

South Korea, and Japan was more than twice that in the developed nations. The rate of growth in Indonesia, Hong Kong, Thailand, and China exceeded that of the above region by more than 50 percent. In Malaysia and the Philippines, the annual rate of growth was higher than that of the above region by 20 to 30 percent. During the economic stagnation period of the 1970's in capitalist countries, most of the developing nations and regions in the Asian Pacific region still grew at a rate of 3.9 to 5.4 percent. In the first 5 years of the 1980's, developed countries in the Asian Pacific region, the United States, Japan, and Canada had an economic growth rate of 2.5 percent. With the exception of the Philippines, developing countries and regions in the Asian Pacific region all had greater than 5 percent economic growth. In the same period, the annual rate of growth of domestic gross value of production in major capitalist countries in Europe was only about 1 percent. In the late 1980's, the economic development in the Asian Pacific region was even more impressive. In 1988, the average economic growth of the region was 6.8 percent; the rate was 5.2 percent in 1989. In the same period, the Europe Community had an economic growth rate of only 3.8 percent and 3.5 percent, respectively. In 1990, the economic growth in the Asian Pacific region was 5 percent. The general view of the economists is that in the 1990's, the economic growth of the Asian Pacific region will still be higher than the rest of the world.

(2) More than 60 percent of the world's population resides in the Asian Pacific region. The population of the developing countries in this region accounts for 50 percent of the world's total population. More than 40 percent of the world's population is in China and South Asia, two low income regions. Because of the large population and the concentration in low income countries, a slight rise in per capita energy consumption can lead to huge increases in total energy consumption. In the industrialization and urbanization processes, there will be large-scale increases in per capita energy consumption, especially the consumption of electric energy.

(3) In the Asian Pacific region, the production of energy is concentrated and the energy producing nations are also large consumers of energy. Energy export is low and local needs are not satisfied. The producing countries for solid, liquid, and gaseous energy are respectively China, Australia, Indonesia, and India. In these countries, China is basically self-sufficient and exports limited amounts. Australia exports a limited amount of coal. Indonesia is a major oil exporter in the region, but the combined oil export from China and Indonesia cannot satisfy Japan's need for imported oil. Although India produces considerable amounts of coal and oil, it itself relies on imported energy to maintain its economic operation. In the long term, domestic energy demands of these countries will be less and less and the amount of imports will be more and more.

(4) There is a shortage in energy resources, especially petroleum resources. The Asian Pacific region has only 16 percent of the world's energy and resource reserves and has even less reserves in petroleum resources. According to statistical data in the OIL AND GAS MAGAZINE published in the United States, the verified oil reserves in the Asian Pacific region as of 1 January 1991 was 134.248 billion barrels, or 13.44 percent of the world's verified petroleum reserves. As of 1 January 1991, oil production in the Asian Pacific region was 14.9779 million barrels, equal to 24 percent of the world's oil output. The petroleum reserve-to-production ratio in the Asian Pacific region is 24 years, less than the world standard of 45 years. The gap between oil production and oil consumption in the Asian Pacific region is difficult to fill. Japan and the United States both had to import large amounts of oil from countries outside the region. ASIAN PACIFIC REVIEW estimated that, in the 1990's, the annual rate of growth in oil consumption averaged 3.6 percent. In the next 10 years, petroleum consumption of the entire region will grow at a daily rate of 3.5 million barrels. By the end of this century, the oil import level of this region will increase by leaps and bounds. FAR EAST ECONOMIC REVIEW, published on 6 December 1990, thinks that the rate of reliance on imported oil in the entire Asian Pacific region will increase from the now 73 percent to 90 percent.

Part II

Being heavily dependent on imported energy, countries in the Asian Pacific region are enthusiastic about promoting energy cooperation in the region. Through cooperation, the energy supply problem of the region can hopefully be solved and the energy security can be improved. Cooperative activities have become more active in recent years, but the actual benefits have not been very great so far.

In August 1977, the ninth meeting of the Pacific Trade Development Conference was held in San Francisco. In the meeting, the production and manufacture of mineral resources in the Asian Pacific region and money supply and trade issues were discussed. It was an historical first for Asian Pacific countries to discuss energy cooperation. Since then, cooperation in energy resources has been placed on the agenda. The main situation is as follows:

(1) Japan is most enthusiastic about promoting energy cooperation in the Asian Pacific region. In 1980, Japan's Pacific Rim Cooperation Research Group proposed the "Strategy for Pacific Rim Resources" in which Japan, the United States, and Canada will serve as the center to establish a united petroleum reserve base and an emergency supply system in the Pacific rim region. The joint effort will develop new energy sources and build a united energy resources research institute. In May 1980, the Japanese group further proposed a "Final Report for a Pacific Rim Cooperation Concept" and again advocated resource cooperation and exchange in Pacific economic cooperation. In 1984, the Japanese Ministry of International Trade and Industry (MITI) decided to implement the "Pacific Rim Coal Circulation Project" and proposed to build coal-powered electric power stations in Southeast Asia countries under United States-Japan cooperation. The United States and Australia will provide coal, and Canada, Southeast Alliance, South Korea, and Taiwan will participate in the project. In December 1984, Japan's MITI further proposed the "Technological and Energy Cooperation Project in the Pacific Region." With regard to energy issues, this project

calls for a Pacific energy conference to establish coal-powered electric power stations, and to promote cooperation among Pacific countries. In March 1985, MITI also formulated a plan to establish a network of regional energy expert groups, to gather information on the energy demand and supply situation and regional prospects, and to make recommendations on the energy policy of the various countries. In April and May of that same year, they also decided to establish a "Pacific Rim Energy Cooperation Council." The mission of the council is to take the reports of the energy experts and to formulate development plans for thermal electric power in the various countries, to formulate standards by which resource export countries outside the region shall provide energy to consumer nations, and to study the ways in which Japan can provide economic and technical assistance to developing nations. From the Gulf War, the Japanese government and its people learned two lessons in energy policy: one is that they cannot let their guard down on energy supply safety. By the year 2010, Japan's primary energy needs will be 38 percent greater than the 1988 level. The other lesson is that increased control of Mideast oil by such international petroleum monopolies as Texaco and Exxon has threatened Japan's safe supply of energy. Because of this, the Japanese economy has stepped up its search for new oil sources in the Asian Pacific region. The three large oil fields in western China are attracting Japanese capital like strong magnets.

(2) International and regional organizations are actively promoting energy cooperation in the Asian Pacific region, but the effort is still in the research stage. Beginning in the early 1960's, the Asian Pacific Economic and Social Committee of the United Nations has been studying the production, consumption, and trade of energy in the region. In 1988, there were 31 study reports on Asian Pacific energy and the energy situation in the region was analyzed in detail. In September 1980, the First Pacific Economic Cooperation Conference was held at the National University of Australia. The conference decided to establish a number of expert groups. The groups were to investigate trade, direct investment, communication and energy issues, and to report the results to the committee. After that, a special topic group on mineral and energy resources was established and began its work. In 1989, this group held three meetings in Jakarta, Seoul, and Manila to discuss energy production, consumption, and trade in the Asian Pacific region. In August 1986, the Pacific Rim Energy and Mineral Conference was held in Singapore. More than 400 scientists and industrialists from 45 countries attended. These meetings only facilitated the exchange of ideas and did not lead to any actual actions in energy cooperation.

(3) In recent years, the Soviet Union has actively participated in economic cooperation, particularly in energy, in the Asian Pacific region. With regard to economic cooperation, the Soviet Union proposed the concept of establishing a high efficiency economic consortium in the Far East. The consortium is to be included in the Soviet Union and international cooperation system. In September 1988, the Soviet Union indicated that it would actively join the economic activities in the Asian Pacific region. Since then, the Soviet Union has actively participated in the various meetings on economic cooperation in the Asian Pacific region. The Far East region of the Soviet Union is rich in resources, especially energy resources. Here, the coal reserve is 34 percent of the national total, water resources is 30 percent of the national total, and the estimated oil reserve in east Siberia is believed to be greater than the verified oil reserve of the whole Soviet Union. Therefore, the Soviet Union wishes to participate in the economic cooperation in the Asian Pacific region through its resource development, especially energy development, in the east.

Based on the analysis above, energy development in the Asian Pacific region has the following characteristics:

(1) Countries in the Asian Pacific region are keen on energy cooperation, but only a limited number of countries participate in it and the activity level is not high. Some of the conferences are merely a form of academic exchange and have little effect on the policy of the governments. On the other hand, large-scale cooperation in the region takes time.

(2) Japan and the Soviet Union are actively promoting energy cooperation in the Asian Pacific region, but they both put strong emphasis on their own national interests, which worries other countries.

(3) The complementary nature of energy resources in the Asian Pacific region is not strong. This will have an effect on the scale and prospects of energy cooperation in China.

Part III

Although energy cooperation in the Asian Pacific region provides opportunities for China's energy industry development, it poses more challenge for China's energy industry. Specifically, there are the following issues:

(1) There is a large difference between energy supply and demand in the Asian Pacific region. However, the following problems in China's energy industry prevented the development of energy cooperation with foreign parties.

1. The energy industry in China has difficulty even in satisfying domestic needs, let alone the ability to export energy now or in the remainder of this century.

2. China's energy products structure has problems. First, for many years, coal accounted for more than 70 percent of China's energy products. With an annual oil output of 130 million tons, only 20 million tons may be exported even after suppressing domestic oil consumption. Second, there is a rapidly increasing demand on natural gas in the region. In recent years, the price of natural gas in the world has really taken off because of the pressure from the environmentalists. China's natural gas output ranks number 22 in the world, but it is entirely for domestic consumption.

(2) When participating in the energy cooperation in the Asian Pacific region, China faces stiff competition from other countries in the region. The Soviet Union, Australia, Indonesia, and Vietnam are all actively attracting foreign investments to develop their own energy resources. Compared with China, the Far East region of the Soviet Union is close to major energy consumption markets of Japan and Korea and the energy resources have not been developed on

a large scale. In China, the energy development is moving toward the west, which is not favorable geographically.

Our Strategies

(1) The State should take active steps to develop the energy industry and transform China's energy industry from self-sufficiency to measured export.

1. Establish the energy industry as a leading enterprise. Energy industry is a cross-industrial enterprise. It not only has to provide the society with the necessary energy products for economic development, but it also needs the support of machine building, electronics instruments, chemical engineering, transportation, and communication industries. The number of workers in the energy industries is a significant percentage of the total number of employed. The energy industry can not only provide sufficient energy sources for the national economic development, but it can also lead to progress in other enterprises.

2. Make a strong investment in energy industry and invest in the right places. Energy industry is an investment-intensive industry; the State must invest heavily in the energy industry. In the last 15 years, the Soviet Union energy industry absorbed 70 percent of all the investment increase in the Soviet industry. From 1981 to 1985, the Soviet Union investment in the petroleum industry was equal to 22 percent of their total industrial investment. In China, although there was emphasis on investing in the energy industry, it was not really carried out. The energy industry development ran out of steam and the enterprises suffered severe losses. In order for China's energy industry to overcome its difficulties and participate in the Asian Pacific cooperation, investments in energy must be gradually increased.

(2) The product structure of China's energy industry must be changed as soon as possible to meet the needs of the Asian Pacific and world market.

1. Economic development needs more petroleum based, low pollution fuel. China produces more coal than oil, and we must investigate ways to convert coal to a liquid fuel to supplement the shortage of oil.

2. Step up the development of natural gas export.

(3) Actively improve the overall investment environment in China and the sub-environment for energy investment. Make a major effort in attracting foreign investments to promote China's energy industry development.

Adopting New Measures To Develop Energy Resources

926B0063A Beijing ZHONGGUO NENGYUAN [ENERGY OF CHINA] in Chinese No 1, 25 Jan 92 pp 10-15

[Article by the Forum of Senior Advisors of the Ministry of Energy Resources: "Adopt New Measures To Develop Energy Resources"]

[Text] Recently, Minister Huang Yicheng [7806 3015 6134] chaired the convening of a forum of Ministry of Energy Resources senior advisors that focused on discussing three issues: the need to adopt new methods for newly- built coal mines and power plants, developing wind-powered electricity generation and other new energy resources, and being concerned with economic results. The experts also offered many constructive opinions on readjusting our coal development strategy, developing tidal energy, developing fuel batteries, accelerating development of natural gas, and other issues.

A summary of the main points of the statements by minister Huang Yicheng and the senior advisors follows.

Minister Huang Yicheng feels that our technology is progressing but world technology is also progressing and their steps are bigger than ours in certain areas. We cannot be satisfied with the present situation and must adopt several new methods to accelerate development.

A major step forward has been taken in power plant equipment in the past several years. The Ministry of Energy Resources has suggested that no power generation equipment with coal consumption in excess of 330 grams [per kWh] can be installed and that we should focus on 300MW and 600MW large generators. Four units should be completed at one time to reduce investments and produce results more quickly. Shajiao B, Hualian Huaneng Power Plant, and many other good models have now come forward. Fully-mechanized mining has played a substantial role since it was imported in coal mines beginning in the late 1970's but we failed to import the management methods of foreign countries at the same time. Coal mines do not depend solely on labor power. It took 3.3 million people and 110,000 university graduates to mine 500 million tons of coal in unified distribution coal mines, while the United States took 135,000 people and 70,000 university graduates to mine 900 million tons of coal and most of the college students were below ground extracting coal. Our total number of college students is larger than in the United States but they do not go underground to mine coal. We use more people and have lower efficiency, and wages as a proportion of costs exceed those in the United States ($3 to $4 per ton in the United States, about 20 yuan per ton in China), so we have no wage advantages. The Ministry of Energy Resources has proposed that new methods must be adopted for construction of new coal mines and power plants in the future. As comrade Jiang Zemin has stated, we should use new technology, new technology that is appropriate for China's conditions, and we should use new highly-effective management methods and improve the educational levels of workers. Overall, there should be fewer people, higher levels, higher efficiency, and lower costs. The coal industry cannot be viewed as an industry for investment of physical labor. It should be managed as a high-tech industry or managed as an industry with relatively high technical levels. We know how to use fully mechanized mining and there are problems with large-scale high efficiency fully mechanized mining manufacturing technology, but they are not unsolvable. The key is to improve the quality of personnel. One method says it would be best to send young college students underground to mine coal while another method is to select several upper middle school graduates who are mining coal and send them to college. If quality is improved, productivity would increase, costs

would drop, and safety would be improved. Implement new methods for new news, develop models and then extend them, and old mines should study them.

Actively develop wind-powered electricity generation and other new energy resources. It will be impossible for us to become a moderately developed country without a certain amount of electric power. We now depend mainly on coal. There are major problems with burning coal and transporting coal and 40 percent of our railroad [capacity] is used to transport coal. We must transform our energy resource structure and develop new energy resources. China has abundant wind power resources and two wind power zones, one on the coast extending from Liaodong Peninsula and Shandong Peninsula on to Fujian, Guangdong, and Hainan, and the other one running from Xinjiang and Inner Mongolia to northeast China. China's meteorological departments have estimated that we have a minimum of 1 million MW in wind power resources. With so many resources, being able to use 10,000MW would not be bad. Wind power should become an army in China's energy resources. Many nations of the world have developed wind power very quickly and it now accounts for 6 to 7 percent of electricity output. We must get organized, import mature technology, digest it, and do our own manufacturing. The production cost for batch lots would not exceed 3,000 yuan/kW, which is the level for hydropower. Wind power does not involve construction schedule problems or land inundation and pollution problems, so it should be actively developed.

I. On the Question of Using New Methods To Build New Coal Mines and Power Plants

The preliminary idea for the new methods for new mines suggested by the Ministry of Energy Resources is to use large and extra-large newly-built mines where fully mechanized mining technology is the main factor to achieve a production pattern with one production work face per mine. The mine production capacity would be 2 to 3 million tons, daily work face output would be 10,000 tons, the total number of employees would be 600 to 800, and full- staff productivity would be 10 to 15 tons[/manshift]. Strip mines should be built and produce according to the Pingshuo Strip Mine model. A series of reforms should be carried out in employee hiring, enterprise management, and other areas.

The preliminary idea for the new methods for new power plants is: Focus on using "three new things" to achieve "three highs". This means adopting new equipment and technology, establishing new management standards and management systems, and applying new management patterns and management methods to achieve the objectives of high personnel quality, high efficiency, and high benefits. The concrete requirement is that new methods can be adopted for all new power plants placed into operation that install generators with a single unit capacity of more than 300MW, two 350MW generators would have a personnel quota of 384, and so on.

All the senior advisors attending the forum supported the methods proposed by the Ministry of Energy Resources and felt that the guiding ideology was correct. Some comrades said that shifting coal industry development toward the areas of relying on S&T progress and improving the quality of personnel were extremely important actions. This has major significance for changing the technical situation and spiritual situation in coal mines, destroying the boundary between cadres and the masses in the system, and changing the situation in which skilled personnel become cadres when they finish training and are detached from the masses and in which the greater the number of personnel trained, the fewer key personnel there are for production. Doing this is essential for solving the problems of too many people, too heavy a burden, and low efficiency, and only then can there be a substantial decrease in the death rate.

However, everyone felt that there were still many difficulties and problems in implementing new methods for new mines and that if we fail to adopt several policies and reform measures, it will be very hard to achieve new ideas. They offered several constructive opinions in this regard.

Wang Shizhong [3769 0013 0022], Zhou Fengqi [0719 7685 6386], Chen Bingqiang [7115 3521 1730], and other experts felt that implementing new methods for new mines first of all requires making conceptual changes.

The conventional concept is that coal mines are labor intensive and depend on physical labor to produce coal, that it is simple-minded, dark, rough, dirty, and repetitious, and that coal can be dug out simply by someone going underground like in small coal pits where people leading a packhorse can get some coal out. This sort of concept certainly does not conform to the requirements of socialist modernization. People in all areas were very startled by the high-tech of the United States in the Gulf War and China should also accelerate technical progress. What can the coal industry do? Again, like general secretary Jiang Zemin has said, the first thing is to build on a new technical foundation and the second is to have top-notch laborers. These are the factors of production discussed by Marx. The higher the factors of production, the higher output will be. The Ministry of Energy Resources has called for implementing new methods for new mines to change past concepts. Concrete implementation, however, will require overcoming ideological resistance and the momentum of tradition before it can proceed.

Wei Tong [7614 0681] feels that the conditions now exist for China to implement new methods in new mines. He said he understands that implementing new methods in new mines means starting now in building several highly efficient modernized mines and mining regions and making a fundamental change in the backward situation in coal mines. The conditions are mature for having new methods in new mines based on three points: 1) After more than 10 years of manufacturing and using fully mechanized mining, the coal industry now has the ability to grasp high efficiency high-tech. 2) There are many suitable geological conditions. Achieving high-output high-efficiency mines requires conditions similar to those in foreign countries like Canada, Australia, the United States, and so on. We are now gradually preparing these conditions. In the several decades since Liberation, we have focused on developing east China and northeast China and have been developing Shanxi over the past 10 years. The conditions exist in a substantial part of

Shanxi's Carboniferous and Permian coal fields and northwest China's Jurassic coal fields, which account for 60 percent of our reserves. A preliminary suggestion has now been made that 18 mining regions including Shenmu-Dongsheng, Jungar, Jincheng, Lu'an, Jining, Huangling, Pingshuo, Baorixile, Hedong, Datong, Lingwu, and others are suitable for high-power high-efficiency fully mechanized mining and most of them fall within this scope. High-efficiency fully mechanized mines could be built in several of these mining regions. 3) We can import advanced equipment and study advanced management experiences in foreign countries. With these conditions in place, doing our work well would enable us to implement new methods in new mines.

Ge Fu [2047 1133], Wu Dijing [0702 6611 0311], Zhai Dongjie [5049 2639 2638], and others felt that implementing new methods in new mines requires further surveys and analysis of China's mineral resources, guidance by categories, and focused development.

The new methods for new mines that we are proposing are suitable for high- efficiency fully mechanized mines. Conscientious analysis is required to determine how many mines satisfy these conditions. A set of fully mechanized mining equipment, for example, produces 2 to 3 million tons each year, which would require about 4,000 meters of forward extraction. There must be concrete surveys and discussion to get an idea of the number of battlefronts in China that can be opened like this. Conditions in China's coal mines are complex, management requires many levels, and mechanization also requires many levels. We must implement guidance by categories. This requires the selection of high-efficiency fully mechanized mines with suitable conditions as well as mines that have definite limitations on the number of coal seam conditions to develop excavation machinery and equipment adapted to different conditions to promote the mechanization of coal production and improve results over a large area. Implementation of new methods in new mines concerns the issue of importing equipment as well as reform of the management and personnel systems and wage allocation system, so it is not so simple and we should select several mines to conduct trials. Implementing new methods for new mines also requires gradual implementation of new methods in existing production mines that have the proper conditions.

Peng Shiji [1756 0013 3444], Wei Tong, and other experts feel the key to implementing new methods in new mines is improving the quality of personnel.

The value of underground fully mechanized mining equipment in modernized coal mines is more than 20 million yuan. An identical strip mine with five to six 27 m^3 electric shovels and 154-ton trucks would also have a value of more than 60 million yuan. Thus, they must be operated and managed by highly technical and good quality personnel. Of course, this is not just because of the cost of the equipment. It is also important that we allow high-tech equipment to truly play a supporting role in high output.

Improvement of quality depends mainly on training. These methods can be adopted: 1) Select one or two trial mines, select mine managers and senior engineers and more than 30 basic-level cadres and send them as a group to a foreign country for 1 year of training. The foreman can be selected from among college graduates and we can send third-year mining department or machinery department students with both ability and political integrity for training. 2) Select people with specific educational levels for training from among the workers. 3) Do systematic internal recruiting from the high school graduate sons and daughters of coal employees and conduct examinations for entry for the corresponding grades. At present, the coal industry is arduous and dangerous and it is difficult to recruit students from society. Moreover, the low high school education levels of mining regions mean that the sons and daughters of the coal industry cannot pass college admissions tests. Implementing recruitment for training within the industry would help stabilize employee staffs and quickly improve the quality of coal mine employee staffs.

Wu Jing [0702 0079], Peng Shiji, Wei Tong, Zhou Fengqi, and other experts feel that implementing new methods in new mines requires adopting advanced equipment as well as adopting new methods in management and other areas. For example: 1) Divide production, production services, and living services into several lines for management. 2) Implement integrated management for production and construction and have no significant boundaries. 3) Implement diversified administration, implement regional integrated production models centered on coal production, and change the situation of simple production. 4) We can study management methods in collective enterprises or three capital source [foreign capital, overseas Chinese capital, and Hong Kong and Macao capital] enterprises. 5) Implement deregulation of coal prices, and so on.

Wu Jing discussed ideas for a new management system in coal enterprises. There are several problems at present in the management system of China's coal enterprises. There is a great contradiction between large and small mines. Although the state has promulgated the "Mineral Resource Law", approval of mining rights is in the hands of local governments. This is one of the main reasons for the arbitrary development of small mines. Some areas issue mining licenses to small mines but large state-run mines cannot obtain mining licenses. Small mines have spread throughout many large mining regions and are plundering the resources of large mines and threatening the safety of large mines. In some mining regions, unified distribution coal mines, local state-run mines, township and town mines, military-run mines, and reform through labor mines coexist and management is chaotic. I propose that companies in which state-run mines are the backbone be established in several mining regions for unified management of military-run mines, reform through labor mines, and township and town mines and that administrative mechanisms for divided production, unified transportation, and unified marketing be adopted to eliminate the use of illegal methods for locating railway cars, reselling coal at a profit, and reaping sudden huge profits. This type of unified company has prominent advantages but substantial resistance as well. It can be achieved, however, if central authorities decide to.

Moreover, it would be best if central administrative departments had unified management over the China Unified Distribution Coal Company, East China Coal Company, cleaned coal companies, local coal companies, coking coal companies, and so on to form an effective fist and foster the potential roles of our existing geology, design, construction, mechanisms, scientific research, schools, and so on. The weak coal market at present is an excellent opportunity for readjusting and establishing a new system.

Wen Kechang [3306 0344 2490] feels that implementing new methods in new mines requires providing good training and improving the quality of personnel. With 300 people managing a power plant, the quality of personnel must be good. At present, most people will not do. We must reinforce training and raise a substantial portion up to the university graduate level. Workers in large power plants in England must first obtain operating experience with small power plant generators before they are transferred to large generators. Improving the quality of personnel will require a great deal of work. First, we must focus on providing good training so that those who pass qualifications tests are appointed to posts. We must develop simulation training centers that must be complete duplicates. If a single power plant cannot build one, then one can be built in a region for rotational training. Second, we should carry out directional training. Third, we should foster the role of existing university students. Regardless of the type of work they are doing, university students should first be workers and operating personnel and be forged through practice.

The Construction of the Electric Power Base and the Economic Development of Shanxi

926B0054C Beijing ZHONGGUO NENGYUAN [ENERGY OF CHINA] in Chinese No 12, 25 Dec 91 pp 29-31

[Article by Bian Xuehai [0593 1331 3189] and Sun Xihua [1327 6007 7520] of the Chinese Electrical Engineering Society]

[Text] Since the Third Plenum of the 11th Party Central Committee, the industry, agriculture, and the entire economic development of Shanxi, like that of the whole country, obtained remarkable achievement. There were major breakthroughs in the construction of energy and heavy chemical bases. The annual export of coal from Shanxi exceeded 200 million tons and was sold to 26 provinces, municipalities, and autonomous regions in China and 10 countries in Asia and Europe. The coal export from Shanxi ranked the highest in China. The development of electric power also led the country. The rates of increase of generator capacity and annual output in the last 10 years have both exceeded the national average. The per capita electric power of Shanxi ranked third among the provinces and regions of China. The annual export of electric power reached 6.468 billion kWh and ranked highest among China's provinces. The percentage of primary energy conversion has been increasing year after year. The industrial structure is becoming more sensible and the economic benefits have been improving every year.

1. Shanxi is becoming the electric energy base of the north China grid

A natural endowment of coal resources gave Shanxi an edge in the development of its electric power industry. To date, the total generator capacity in Shanxi has reached 6.1420 million kW and the annual output has reached 31.382 billion kWh (including the two power plants in Datong). During the Sixth and Seventh 5-Year Plans, the electric power industry in Shanxi enjoyed 10 years of rapid development and increased its generator capacity by 3.4564 million kW, which was 1.45 times of the pre-1980 generator capacity of 2.3856 million kW. In terms of location, large thermal power plants such as Shentou, Datong, Taiyuan, Zhangze, Niangziguan, and Hezhou are all built near large coal mines. This not only reduces the amount of transportation needed, but it also converts coal into a secondary energy source; the electric energy is delivered in all directions through high voltage transmission lines. During the Seventh 5-Year Plan, Shanxi exported 22.384 billion kWh of electric power. In 1990, Shanxi exported 6.468 billion kWh. The amount of electric power delivered to outside the province was more than 20 percent of Shanxi's total power production (including the two power plants in Datong) and the export of raw coal has decreased correspondingly. This has saved a great deal of money, and has also reduced the pressure on the transportation system. As the electric power industry develops and the electrification of cities and villages progresses, the quality of industrial and agricultural equipment and people's standard of living has improved by leaps and bounds. In the Eighth and Ninth 5-Year Plans and in the 10 years to follow, Shanxi plans to build 11 high-performance, high-capacity, advanced power stations at nine sites. The increase in capacity will be 11 million kW and the annual electric power export will be 12.5 billion kWh. In the meantime, a modern power grid and village grids based on 500 kV lines and supplemented by 220 and 110 kV lines will be built. The development of electric power bases has opened up great prospects for future economic development in Shanxi.

2. The economic development in Shanxi should be based on coal and electric power

Experience shows that the electric power industry is not only a foundation industry worthy of development, but is also an indicator of the degree of development of a region. Shanxi is an energy exporter. The primary energy consumed by power generation is only about 6 percent of Shanxi's total production of the primary energy source—coal. On the other hand, even though electric power is moving forward rapidly in Shanxi, it too suffered 19 years of electric power shortage just like other places in China. Experience has proved that, without an ample supply of electric power, the goal for Shanxi to become a base for energy and heavy chemical industry cannot be achieved. The easiest approach to realize energy export and build a base of heavy chemical industry is to convert coal into electric power. This will at once satisfy the electricity needs in the province and support other provinces. We, therefore, believe that the development of Shanxi's energy production industry should be anchored on coal and led by electric power. This should

become Shanxi's development strategy for the national economy so that the industrial and agricultural production is backed by reliable power.

In the second half of 1988 and the first quarter of 1989, China's economy went out of control and coal production slipped. Even though the supply of coal was inadequate and the transportation was impeded, Shanxi's electric power production was not affected. It had the best performance among the provinces and municipalities and exceeded the target in power production by the largest margin. During the Asian Games, Shanxi averaged an output of 2.995 million kW and the maximum modulation load for the provincial capital was 200,000 kW. The whole grid frequency qualification rate was 100 percent, a performance China was proud of. Experience in manufacturing and operating 500 kV superhigh voltage power transmission and transformation equipment showed that, in terms of investments and operating costs, it is cheaper to transmit electric power than to build railroads and pipes for coal transport. Therefore, Shanxi has the distinct advantage of building electric energy bases right by the coal mines.

3. To realize the strategic goals of development in Shanxi, we must first formulate the corresponding regional development plans and the policies and practices that will guarantee the implementation of the plans

From the end of the Seventh 5-Year Plan to the Eighth 5-Year Plan, the number of large energy consumers in Shanxi increased by 38, most of them major industries related to the national economic construction. Therefore, regional development plans for Shanxi's resources will undoubtedly strengthen the role of Shanxi's energy bases in China's economic construction. Regional development strategies in Shanxi should, therefore, be included in the national economic development plan, and the economic development in Shanxi must also maintain a stable and sustained coordination with the national economic goals proposed by the party Central Committee. Shanxi needs to formulate staged implementation goals for the various development stages. Based on the goals set in the plan and the correlation between the development of agriculture, light industry, and heavy industry, a unified coordination plan should be proposed. The implementation of the plan should reflect the systematic and proportional approach in economic development; one should never blindly go after unrealistically high speed, high target, and quantity over quality. Under an overall guideline, the state should also support the energy base development in terms of credit, investment, finance, and tax matters. Support should especially be given to development in electric power and coal and to research and development projects in power and energy.

In view of the diversity of the investment channels, we should consider making suitable adjustments of the electricity price, commensurate with the ability to pay back, to provide the money needed for electric power construction. While preserving the capital and gaining incremental profits, we should lead the electric power construction onto a road of positive reinforcement. Today, China is, on the one hand, feeling the pressure of electric power shortage and, on the other hand, wasting an alarming amount of energy. The root of the problem is that the price of electricity is too low, and as a result, the consumer enterprises lack a mechanism of self-control and conservation. The implementation of the low electricity price policy has become a de facto subsidy by the state. This policy is very detrimental to the development of the power industry. Thus, policies in credit, taxation, electricity and heating prices, and business insurance should all be consistent with the enterprise policy and moves forward in a complementary and coordinated manner. As a province with developing resources, Shanxi must start from the strategic position of the national development and make overall planning, rational layout, setting priority and integrated development as its strategic policies. Using electric power development as the lead, Shanxi should strengthen its transportation, coal, and water resources, develop its coal, coke, and chemical industry, appropriately adjust its manufacturing industry structure, improve the agricultural production facility, and achieve a coordinated development in agriculture, light industry, and heavy industry.

4. Devote great effort to S&T development, promote technical progress, implement the economic strategies of Shanxi, and facilitate the "marriage" between economy and technology

Nowadays, it is impossible to have social and economic development without the support of technological progress, especially for regions having resources. Electric power must be given a central position in the transformation toward semi-manufacturing and manufacturing economy. First, there must be electric power, then there can be manufacturing industry. In mid- and long-term planning, power technology must be a high priority in S&T investment.

(1) *Choose an appropriate technical approach, make full use of the coal resources, and improve the economic efficiency and technical level of thermal electric plants*

1) Groups of power stations should consist of large capacity, high performance thermal electric plants. Under a centralized plan, technologically advanced large capacity and high performance generators that are energy efficient should be used wherever possible. Around the turn of the century, 200,000 kW generators should gradually be replaced by 600,000 kW units. Advanced foreign technology and equipment may be imported to improve the level of domestic equipment. The main grid of Shanxi's ultra-high voltage power grid should be improved. Major ultra-high voltage transmission lines should be built to transfer electric power from north, central, and southeast Shanxi to east Shanxi. Improve the reliability of generating, transmitting, and transforming electric power. Use advanced monitoring techniques, improve the level of automation, form strong and reliable electric power supplies, and develop 1 MV superhigh voltage AC-DC power transmission technology for supplying energy to northeast and eastern China. Study the feasibility of DC reversible transmission with different voltage systems in the northwest in order to shift the load between the hydroelectric grid in the northwest and the coal power grid in Shanxi.

2) Remodel old plants and develop thermal electric plants of all sizes. Formulate a sensible heating network and enlarge the range of heat supply in order to lower coal consumption and improve the environment. The old plants in Shanxi are all located near cities; they should be converted into regional large heating plants in order to reduce the number of small boilers and scattered supply of heat. Heat pump and heat pipe energy conservation techniques should be developed. Engineering applications of vertically buried pipes and concentric pipes should be developed to save steel, land, and construction costs. Encourage enterprises to build new power or heat stations or to enlarge them.

3) Improve the composition of electric power sources. Actively develop water resources of the Huanghe for hydroelectric power. Use the Huanghe to help Shanxi, develop the hydroelectric resources at Wanjiazhie, Longmen, and Fenhe. Combine the development of water resources, build large capacity pump and energy storage stations, improve the peak shifting ability, and elevate the overall efficiency of the grid. Actively survey and develop water resources at Yanbei, central Shanxi, and southeast Shanxi, and investigate water conservation techniques.

4) Improve scientific research for environmental protection of thermal power plants. Seriously formulate environmental management regulations to stop the deterioration of the environment and gradually turn the situation around. Shanxi is in a good position to utilize waste gas and dross and to produce construction material from coal ash. Efforts should be made to investigate low cost recovery techniques for de-sulfurization and for treating NO_x, SO_x, and smoke. Methods for large scale, large area dross, and ash utilization should be made high priority research topics.

(2) *While strengthening applied technology, attention should also be given to high-tech R&D in order to provide technological reserve for achieving long-range strategic goals*

1) Pay attention to R&D of coal chemistry and precision chemical engineering. While improving current technology and procedures, do more research on dry distillation technique for coal and gasification and liquefication of coal. In the process, extract methanol and other chemical elements and synthetic materials so that the coal processing technology can gradually reach maturity.

2) Pay attention to R&D of fuel dynamics of coal. Adopt advanced combustion theory, test advanced combustion facilities, improve the conversion efficiency of coal, and develop new, high-efficiency combustion facilities.

3) Investigate the application technology of combined gas and steam cycle devices that can burn coal gas.

4) Since a very small percentage of the coal was converted and the transportation ability is inadequate, a large amount of coal has piled up. We should take a practical approach and devote some major efforts in the feasibility study of extracting petroleum from coal and in the manufacture of household chemical products. This would allow local conversion of energy and material resources and would improve the economic efficiency and competitiveness.

Coordination of Energy Development and Environmental Protection Discussed

926B0063B Beijing ZHONGGUO NENGYUAN [ENERGY OF CHINA] in Chinese No 1, 25 Jan 92 pp 43-44, 33

[Article by Shu Huifen [5289 1920 5358] of the Ministry of Energy Resources Safety and Environmental Protection Department: "Energy Resources and Environmental Protection Must Be Developed Simultaneously"]

[Text] Protecting the atmosphere and preventing climatic changes is a common challenge facing all of mankind. As a big mineral fuel producer and consumer, China has a profound understanding of its own responsibilities. China has established a multi-departmental "National Climatic Change Coordination Group" that specializes in research on related questions and proposes countermeasures. We are also making our greatest efforts at improving energy efficiency and afforestation and have adopted truly effective measures on a national scale.

China, a developing country with a per capita GNP and per capita energy consumption far below the developed nations, must achieve sustained economic growth to eliminate poverty and strengthen its abilities to protect its own environment and actively participate in global environmental protection cooperation. From another perspective, if the environment suffers catastrophic destruction, economic development will also be restricted. Thus, we must deal properly with the relationship of economic development and energy resource development to environmental protection and strive for coordinated and simultaneous development of both.

The energy resource industry is a basic industry and a strategic focus in China's economic development. At present, energy resource development cannot keep pace with the needs of national economic development. During the Seventh 5-Year Plan our GNP grew at a rate of 7.7 percent and our gross value of industrial and agricultural output grew at an average rate of 10.01 percent, but the corresponding rate of growth in energy resources was just 3.92 percent and the rate of growth for electric power was 8.5 percent. To attain an average yearly growth rate of 6 percent of GNP and 7 percent of the value of industrial and agricultural output over the next 10 years, the yearly growth rate for primary energy resources must be held at about 3 percent and the average growth rate for electric power should be greater than 7 percent. The energy conservation rate for society as a whole must be greater than 3 percent.

For these reasons, the basic principle for China's energy resource industry is: continue adhering to the principle of combining development with conservation and strive to improve the energy resource production structure and consumption structure. The energy resource industry should have electric power as its center and coal as its foundation, make major efforts to develop hydropower, actively develop nuclear power, actively develop petroleum and natural gas, and accelerate rural energy resource and electrification construction. Make major efforts to conserve electricity and conserve coal, extend heat and power cogeneration, develop surplus heat utilization, continue to implement the policy of

substituting coal for oil, strive to raise energy resource utilization rates, and reduce environmental pollution.

Because coal is China's dominant energy resource, the main polluter of the atmosphere is coal smoke. To deal with atmosphere pollution, we should focus on preventing pollution caused by coal extraction and utilization.

I. Make Major Efforts To Conserve Energy Resources and Reduce Energy Consumption

From the perspective of environmental benefits, improving energy resource efficiency is the optimum strategy. The basic energy resource principle of "combining development and conservation" is a requirement for reducing energy consumption and improving economic benefits as well as a fundamental measure for achieving long-term coordinated development of economic construction and environmental protection. Energy consumption in China is rather high and there is great potential for energy conservation. Over the past 10 years, the Chinese government has adopted a series of policy measures and achieved significant results in conservation, saving about 220 million tons of standard coal over 10 years. In the future, by adopting new technology and doing technical upgrading, we can also exploit energy conservation potential in these areas:

1. Reduce unit consumption in products and energy consumption in raw materials. The operating efficiency of blowers and water pumps in China's industrial departments is 20 percent less than similar products in the industrially developed nations, which is equivalent to consuming an additional 30 billion kWh of electric power each year. To use administrative measures to compel conservation, the state has promulgated 713 energy-saving products in 13 groups and announced the abandonment of high energy consuming products.

Total energy consumption per ton of steel in China averages more than 1,500 kg of standard coal, double the amount in the developed countries. By the end of this century, China's steel output will exceed 80 million tons. If our energy consumption could reach the indices in the developed countries, we could conserve 50 million tons of standard coal a year.

2. Increase the combustion efficiency of coal. China now has 140,000 industrial ovens and kilns that consume 200 million tons of standard each year. Because of the low rate of heat utilization, we consume an excess of 40 million tons of standard coal a year.

We have 400,000 industrial boilers with a total capacity of 800,000 tons/hour that consume an excess of 38 million tons of coal each year. Converting one-tenth of them to heat and power cogeneration could permit installation of 10,000MW of generators and conserve energy equivalent to 6 million tons of standard coal each year.

Average coal consumption for power generation in China's thermal power plants was 428 g/kWh in 1990. To reduce coal consumption, in the future we should focus on developing 300MW and 600MW high parameter large generators which consume no more than 330 g/kWh for power generation, and we should upgrade or abandon several old generators. Average coal consumption for power generation in China must be reduced by 50 to 60 g/kWh over the next decade. This could reduce coal consumption by 50 to 60 million tons by the year 2000.

Raising the proportion of shaped coal for civilian use from the present 28 percent to 50 percent could conserve 4 million tons of standard coal each year.

3. Structural energy conservation. There could be substantial energy savings by converting from clay bricks to hollow-core bricks. The state has already set the investment direction tax for residences with new types of wall materials at 5 percent and will set the directional tax for new types of wall materials and energy-saving residences at "0".

Simply by combining all of these things, the yearly savings could exceed 100 million tons of standard coal. This is analytical potential, however, which does not mean that it would be easy to achieve. There must also be policies, investment strengths, and new technology in this regard to serve as supporting conditions.

II. Improve the Energy Resource Structure

1. Continue to increase the proportion of coal converted to electric power. The present proportion of coal converted to electric power is about one- fourth, and there is great waste of energy resources from direct burning in other industrial and civilian uses, which also creates severe pollution. The proportion of coal used to generate electricity should be increased to 33 percent over the next 10 years.

2. Accelerate hydropower construction. This mainly involves increasing the proportion of investments in it over the next 10 years. The focus is on construction of several large hydropower stations on the upper and middle reaches of the Huang He, the trunk and tributaries in the upper reaches of the Chang Jiang, the Hongshui He, and the Lancang Jiang and construction of several medium-sized and small hydropower stations in the energy-short south China, east China, and northeast China regions. In addition, we will also build several pumped-storage power stations for combined operation with large thermal power plants and nuclear power plants to solve problems of power grid peak regulation.

3. Make major efforts to develop coal dressing and processing. This improves the quality of coal, reduces useless transportation, and helps protect the environment. The amount of coal washed in 1990 was 190 million tons, for a washing rate of 17.6 percent. In the future, we must continue to increase the washing rate and gradually achieve the dressing of all coal transported over long distances.

4. Use superior quality coal for supply to civilian uses in urban areas.

5. Accelerate the development and utilization of wind power, solar power, geothermal energy, and so on.

The annual solar radiation on two-thirds of China's territory exceeds 2,000 hours, so there are broad prospects for solar energy utilization. During the Eighth 5-Year Plan we should

develop 5MW of solar energy utilization to generate electricity, 21MW of wind energy power stations, and 6MW of geothermal energy electricity generation.

III. Control Pollution Created in the Coal Extraction and Utilization Processes

This mainly involves dealing with spontaneous combustion of coal gangue, extracting and utilizing mine gas, controlling discharges of soot and sulfur dioxide from coal-fired power plants, and so on.

IV. Develop Afforestation Over Large Areas

Forests are the green areas with the strongest capacity for manufacturing oxygen as well as secondary storehouses for carbon dioxide. One hectare of broadleaf forest absorbs 1 ton of carbon dioxide each day and releases 0.73 tons of oxygen. Each year, the Earth's forests can convert 55 billion tons of carbon dioxide into timber and release more than 40 billion tons of oxygen at the same time.

Each year China undertakes mass afforestation. Over the next 5 years, we will afforest 375 million mu, close 180 million mu of hillsides to facilitate afforestation, and increase the forest area by 270 million mu to increase the forest coverage rate from the present 12.9 percent to about 14 percent by 1995.

In dealing with environmental problems that are of common concern to mankind, to effectively strengthen the ability of all countries to participate in global environmental protection cooperation, we must form common understandings in these areas:

1. The world's climatic changes are mainly the result of the long-term utilization of large amounts of mineral fuels in the industrially developed nations over the past several 100 years of the industrial revolution, which means that it is mainly the developed countries that have taken over environmental capacity. The developed nations must bear the primary responsibility and the corresponding duties in this area and establish the necessary mechanisms to support developing countries in adopting advanced technology. We cannot abstractly discuss protection of the atmosphere as the "joint responsibility" of all of mankind. The developing countries also bear a certain amount of responsibility but we must clarify primary and secondary responsibility and the primary and secondary actions that must be taken in the future. Besides implementing the required control measures in their own countries, the developed nations should also take greater real action regarding the question of capital and technology transfers, assist the developing nations in more effectively participating in international cooperation to protect the Earth's atmosphere, and provide developing countries with capital to be used for protecting the atmosphere and other types of environmental protection. This should be "new" and "additional" and not "re-allocation of capital" in existing development assistance. The method of reducing assistance to development projects in order to increase capital for environmental protection can damage economic development in the developing countries and ultimately will further weaken their ability to participate in global environmental protection cooperation.

Regarding the issue of technology transfers, we hope that the United Nations will play its own role and formulate several principles. These principles should differentiate control technology and pollution reduction technology in the environmental field from the normal concept of "market commodities". They should be viewed as compensation by the developed nations after their use of atmospheric and environmental capacity, not as charity for the developing countries. Of course, the developed nations that control this type of technology have all the required conditions to use the necessary domestic procedures to solve the relevant questions of intellectual property rights and, while protecting and encouraging scientific research and innovation, to ensure that the developing nations receive non-commercial technology transfers under the most favorable conditions.

2. Conserving energy resources and increasing energy resource utilization rates are strategic measures for environmental protection. The developed countries as well as the developing countries should strengthen their consciousness of energy conservation, which is the same as the issue of strengthening ethics as discussed by the leaders of the United Nations Educational, Scientific, and Cultural Organization. All have their own energy conservation duties but their points of focus may be different. There are no limits to raising technical levels in energy resource utilization, and some countries must reduce waste of energy resources caused by artificially excessive energy resource consumption.

3. The focus of work at present in the relevant organizations of the United Nations should be placed first of all on conserving energy resources, developing renewable energy resources, and controlling atmospheric pollution while at the same time providing assistance to developing countries in technology, capital, and training.

This sort of assistance should begin with actual conditions in developing countries. Some models suitable for the developed countries are not necessarily appropriate for developing countries. Training also should be integrated with reality so that the greatest returns are truly achieved for the minimum investment.

The developing countries should also use their own characteristics as a basis for selective study of experiences in other countries, properly integrate their economic development with environmental protection, and strive for coordinated development of their economy, society, and environment.

State's Strategic Plan Spurs Development of Xinjiang's Energy Industry

926B0071B Urumqi XINJIANG RIBAO in Chinese 13 Feb 92 p 1

[Text] The westward trend and investment shift in the state's energy strategy has spurred the development of the Xinjiang Uighur Autonomous Region's energy industry. Last year, the region's total energy production broke through the critical barrier of 30 million tons of standard coal for the first time, and 4.666 million tons of crude oil and refined oil and 4.341 tons of raw coal were shipped out.

Xinjiang has abundant energy resources, and it ranks first in the nation in projected coal reserves and total oil and

natural gas reserves, accounting for one-third, one-fourth and one-third of the nation's total reserves, respectively. Hydroelectric, wind and solar power resources are also in the forefront nationally. Along with the westward trend and investment shift in the state's energy development strategy, Xinjiang is now transforming its potential resource advantages into actual economic advantages.

In 1991, Xinjiang's energy industry persisted in placing equal emphasis on energy development and conservation, strengthened policies on such matters as macroscopic regulation, and promoted stable increases in the production, transportation and marketing of coal, oil and electricity. According to statistics, in 1991 the region's total energy production may have been equivalent to 30.96 million tons of standard coal, a 10.8 percent increase over the previous year, exceeding the average rate for the nation as a whole. While the market for coal was weak and there were transportation difficulties, raw coal production still reached 20.8 million tons, maintaining the 1990 figure; and while oil production exceeded state plans and the transportation and marketing of crude oil and refined oil were improved and the economic benefits increased, crude oil production for the entire year, with the exception of the Tuha oil field, still reached 7.5722 million tons, an 8.9 percent increase over the previous year. Natural gas production increased 10 percent over the previous year, reaching 551.67 million cubic meters. Electric power production also made significant progress, with total production for the year at 7.65 billion kilowatt-hours, an 11.7 percent increase over the previous year. This ensured that the autonomous region's energy needs for economic construction and the people's productive livelihood were met.

The state's major investment has enabled the large-scale oil projects in Xinjiang's three major basins to continuously report success, and new oil fields have sprung up while the old oil fields have shown the vigor of youth. According to statistics, in just the first 11 months of last year, investment in state projects reached 4.54 billion yuan, a 103 percent increase over the same period the previous year. At present, the Yakela, Lunnan, Tazhong and other high-yield oil and gas fields in the Tarim Basin have been opened up, with a daily crude oil production reaching a new high of 2,000 tons, an 800-ton increase over the daily production early last year; in the Tuha oil field, which was established later, four new oil fields, including Shanshan, Yila Hu, Qiuling and Wenjisang, have been discovered, and are already capable of producing more than 500,000 tons of crude oil annually; the Karamay oil field, an old oil field, produced 7.0216 million tons of crude oil last year, 220,000 tons more than in the previous year, an increase equivalent to the average of the major oil fields nationwide. Before the end of the year, in a few of this oil field's strategic exploratory wells in the basin's hinterland, all of the oil and gas that gushed forth was high-yield.

Last year, Xinjiang's key electrical power construction projects and electrical construction in agricultural and pastoral areas made greater use of wind and solar power. The number of hydroelectric stations in the region grew to 615, and small-scale hydroelectric use is second to none in the northern part of the country. Fukang County was the first in the country to implement basic rural electrification. The Manasi power plant's second stage expansion is being stepped up. The largest hydroelectric project in Xinjiang, the Dashankou hydroelectric station, also began producing power for the network before the first day of the new year, laying a solid energy base for the southern Xinjiang minority region's economic development and the Tarim oil field's overall exploration. In addition, in coal mine construction last year, basic facilities were successfully completed and technology was transformed. By the end of the year, China's first domestically manufactured comprehensive mechanical coal-extracting installation was put into operation at the Urumqi Mining Bureau. Xinjiang has already constructed three major coal base areas—Urumqi, Hamisandao Ridge and Aiwei'ergou.

Last year, while Xinjiang was strengthening construction of its energy base and increasing its production capabilities, it also emphasized increasing efficiency and benefits. The development of energy conservation and cost-cutting and technological transformation has brought new improvements in all types of technical and economic indexes. Energy waste in industries with more than 10,000 yuan in output was cut to about 4.5 tons of standard coal, a figure nearly 5 percent lower than in the previous year. The entire region's energy conservation reached more than 500,000 tons of standard coal, exceeding the year's plan by 20 percent.

Inner Mongolia Meets Goals of First Year of Eighth 5-Year Plan

926B0067A Hohhot NEIMENGGU RIBAO in Chinese 16 Jan 92 p 1

[Excerpts] In the first year of the Eighth 5-Year Plan, Inner Mongolia's power management bureau developed an in-depth "Year of Quality, Variety, and Results" campaign. When it concluded on 25 December 1991, the two-pronged growth and conservation plan to generate 8.8 billion kilowatt-hours was completed early, and exceeded the amount of power generated in the same period the previous year by more than 1 billion kilowatt-hours, an increase of 13 percent; this fulfilled a 509- million-yuan capital construction investment plan.

In 1991, Inner Mongolia's power management bureau elevated economic results to the forefront and launched a thorough campaign to promote safe production, elevate standards and achieve goals. Tens of thousands of workers made improving management of installations a priority, waging total warfare to raise enterprise management standards in all areas. In the entire bureau, they drew up 10 installation management goals and 52 key installation management plans, and put more than 17 million yuan of funds into major repairs and technological transformation, which showed preliminary results in installation management. From January to September, power generating units were used an average of 5,600 hours, and in the fourth quarter, the use of the equipment increased to 7,543 hours. In the western part of the autonomous region, the rate of operational power network equipment reached 97 percent, a

rather large increase over 1990. [passage omitted] The western power network achieved safe and stable transmission, and from January to November, there were 671 fewer power outage incidents than in the same period the previous year, and power line limitation was 18.18 million kilowatts less than in the same period the previous year. The rate of up-to-standard voltages and cycles was 99.44 percent and 99.18 percent respectively, and in 1 year 1.195 billion kilowatt-hours of power was transmitted to the North China Power Grid, a 93.83 percent increase over the same period in 1990. From January to November, the industrial output value achieved by the entire bureau was 14.77 percent greater than in the same period the previous year. Consumption of standard coal for each kilowatt-hour of power generated fell 12 grams compared to the same period the previous year, saving more than 100,000 tons of standard coal. The rate of damaged lines fell 0.78 percent over the same period the previous year, and plant power consumption fell 0.01 percent. The power management bureau also invested funds to complete water conservation projects at the Fengzhen and Wulashan power plants.

The great number of workers at the front lines of power capital construction have overcome tight project deadlines, technical difficulties and various problems involving funding and materials, and have done an outstanding job of completing construction of the two 200,000-kilowatt units at the Fengzhen power plant, the two 100,000-kilowatt units at the Jungar power plant and the two 50,000-kilowatt units at the Huiliuhe power plant. In half a year, the basic construction of the No. 3 and 4 units of the Fengzhen power plant was 3 months ahead of schedule, and at the end of the year had already achieved the three large-scale advances of reaching the top of a 210-meter stack, closing the main plant building, and building the No. 1 domestically designed and domestically built cooling tower to the standard 60 meters.

The Jungar power plant project, which began on 9 May 1991, is proceeding apace, with high quality. In 1991 the only power supply source to go into operation, the Wulanhaote heat and power plant's No. 1 12,000-kilowatt unit, began generating power to the grid in mid-December. The Fengzhen-to-Jungar electrified railway, with 258 kilometers of 110,000-volt power lines, was completed. The 132-kilometer Wulashan-to-Linhe power line, carrying 220,000 volts, was completed 100 days ahead of schedule.

Shaanxi Power Construction Enters Stage of More Rapid Growth

926B0066B Xian SHAANXI RIBAO in Chinese 27 Jan 92 p 1

[Article by correspondent Yuan Linshen [5913 2651 3932] and reporter He Tao [6320 7290]: "Shaanxi Power Construction Enters Stage of More Rapid Growth"]

[Text] Good news came from the Shaanxi Power Workshop which ended on January 26. Last year, an additional 302,500 kW of power generating capacity was put on line. This year, another 1,000,000 kW will be completed. The total of these 2 years combined is greater than the sum over the past 40 years. Thus, this signifies that power construction in Shaanxi has entered a rapid growth stage. This also indicates that blackout and brownout associated with chronic power shortage will be over soon.

Shaanxi is abundant in energy resources. As the economy grows and the standard of living improves, power shortage becomes a more pressing issue. It became a high visibility issue for the provincial commission and government. A number of projects including two 50,000 kW units at Lueyang Power Plant and two 300,000 kW units at Weihe Power Plant and the Ankang Hydroelectric Power Plant were constructed on a priority basis. In addition, funds were pooled together according to related government regulations to raise capital for these projects. Through the hard work of all employees of the electric power system and with the support from different walks in the local community, a total of 1.2 billion yuan was raised. A 200,000 kW generator unit and a 50,000 kW generator unit were constructed at Ankang and two 50,000 kW generators were installed at Lueyang. Those units were put on-line last year. A 300,000 kW generator at Weihe was also put on pilot run in the fourth quarter of last year to alleviate the severe power shortage we experienced last winter and spring. Two new 300,000 kW generator units at Weihe and two new 200,000 kW units at Ankang will also be officially on-line this year to provide an additional 6 billion kWh of power.

In the workshop, Vice Governor Liu Chunmao [0491 2504 5399] pointed out that employees of the power system in the province must be aware of the seriousness of the responsibility on their shoulders. They must work hard to overcome difficulties to complete the construction of the additional 1,000,000 kW power generating capacity. He also stressed the need to continue raising money to meet the needs in power construction funding in order to accelerate the pace of power construction in the province to stimulate economic growth.

Hydropower To Replace Coal as China's Main Source of Energy

40100049 Beijing CHINA DAILY (Opinion) in English 20 May 92 p 4

[Text] Pollution problems caused by the burning of coal have forced China to turn its attention to a carbon dioxide-free energy source—hydropower.

Ministry of Energy Industry sources say that by the end of this century, the installed capacity of hydropower in China will reach 80 million kilowatts, double the present figure.

By that time, the sources revealed, two-fifths of China's electrical power will come from hydro-electric stations across the country.

The much-debated Three Gorges project over the Yangtze river, whose feasibility study was completed recently, is expected to generate 84 billion Kwhs of electricity annually, the equivalent of burning 40 million tons of coal.

When describing the significance of the Three Gorges project, minister of energy industry Huang Yicheng said, "It is of great strategic importance to improving the entire structure of Chinese energy."

In addition, China in the coming days will emphasize the development of small-sized power stations in the vast rural areas, which are to gradually replace the role of coal burning in rural households, and therefore alleviate its adverse influence on environmental pollution.

Sources from the Ministry of Energy Industry said that in improving its energy structure, China will adopt two main, fundamental strategic changes; accelerating the use of hydropower, nuclear power and other forms of pollution-free new energy and increasing the amount of coal which is burned to generate power.

Coal makes up 74 percent of the total energy sources China now possesses. Statistics show that 70 percent of dust emissions and 90 percent of disharged sulphur dioxide come from coal burning.

The sources said that the first phase of the Qinshan nuclear power station has gone into operation and that the first generating unit of the Daya Bay nuclear power station in Guangdong Province is expected to start operation by the beginning of next year.

By the year 2000, the installed capacity of Chinese nuclear power will reach 6 million kilowatts.

"Although 10 year later, China's nuclear energy will still account for a small part of the country's energy as a whole, the initial development of nuclear power stations will lay a solid foundation for the future," Minister Huang said.

Information shows that only one-fourth of the coal in China is used to generate electricity, a position still a far cry from that in developed countries.

The figure, according to the sources, is expected to be raised to one-third, which means that in the next 8 years, over half of the new coal in China will be used to generate electricity. Using coal for generating electricity instead of heat will greatly reduce coal pollution, sources said.

The Dadu River: A Rich Reserve of Hydropower

926B0054B Beijing ZHONGGUO NENYUAN [ENERGY OF CHINA] in Chinese No 12, 25 Dec 91 pp 14-17

[Article by Zhu Tiezheng [2612 6993 6927] of the Water Conservancy and Hydroelectric Power Planning and Design Institute]

[Text] (I) The Dadu River is the largest tributary of the Min Jiang waterways in the Chang Jiang river valley. It originates on the southeastern slope of Guoluoshan in Qinghai Province and enters the Min Jiang River south of Leshan. The river is 1,062 kilometers long and its river valley has an area of 77,400 square kilometers.

The Dadu River [project] is one of 12 large hydroelectric power stations planned for China. The theoretical hydropower reserve is 31.32 million kW, and 23.48 million kW are exploitable. On the main branch from Shuangjiangkou to Tongjiezi, 17.60 million kW in generators may be installed to produce an annual output of 100.8 billion kWh. This is approximately one-fifth of Sichuan's output and one-sixteenth of China's total output. The Dadu River has a strong and steady flow and its waterheads are great and concentrated. It is, therefore, a rich reserve of hydropower.

In the ninth valley of the Dadu River, the hydropower conditions are sound, the flow is stable, the flood crest is not large, the low water is not small, and the silt content is also low.

The main branch is mainly fed by precipitation and supplemented by melting snow and glaciers. The river valley has a good vegetation coverage and the high and low water seasons in a year do not change the main branch flow drastically. The area of the controlled river valley area above Tongjiezi is 76,400 square kilometers. The long time average flow is 1,490 m^3/sec and the annual run-off is 47 billion cubic meters (roughly equivalent to the Huanghe). Then annual run-off modulus is 19.5 l/s-km^2 (about 10 times that of the Huanghe). The actual measured maximum annual average flow was 1,990 m^3/sec and the minimum was 1,130 m^3/sec; the ratio was 1.76. The actual measured maximum flow was 10,800 m^3/sec and the minimum was 341 m^3/sec; the ratio was 31.7.

The upper reaches of the Dadu River (above Luding) basically has no rainstorms. The middle reaches (Luding to Tongjiezi) is located between two rainstorm zones at Chuanxi and Anninghe and is the main source of storm water in this region. The lower reaches (below Tongjiezi), although in the rainstorm zone, has a small collection area and does not contribute greatly to storm water.

(II) A complicated geological structure is one of the major engineering problems in developing the Dadu River. The main branch flows through three distinctly different geological structures. Above Jintang, the structure belongs to the Ceda-Songpan fault block. The integrity is good, the fracture is undeveloped, and the contemporary activity is weak; the

earthquake magnitudes are 6-7. From Jintang to Shimian, the structure is a merge of the Xianshuihe-Moxi fault zone, the Longmengshan fault zone, and the Daduhe fault zone. This region has pronounced activity and strong earthquakes, with magnitudes of 8-9. The section from Shimian to Gongzui is a series of north-south folds and several directional faults; the activity is not strong, with earthquake magnitudes around 7. The section from Gongzui to the river mouth belongs to the open hilly valley of the Sichuan basin.

Another unique engineering problem in the development of the Dadu River is that the riverbed coverage is thick and the thickness variation is great along the river. The known thickness of riverbed coverage is 70-130 meters above Dagangshan and 30-70 meters below Dagangshan. Only at Dagangshan is the thickness less than 20 meters. Due to the effects of falling rocks, mudslides, and glaciers, the composition of the riverbed cover often contains discrete rocks, porous structure, and fine silt.

The river valley banks are steep and, historically, there have been landslides and earthquake-induced river blockage. Attention should be given to the stability of riverbanks at certain sections of the river.

Magmatic rocks and metamorphic rocks are distributed along the river; there are no seepage problems to the adjacent valley. Most of the cascades chosen were located in hard granite or volcanic rocks within favorable geologic properties. With a few exceptions, the earthquake magnitudes at the cascades are relatively low. Experience has been accumulated in the survey, testing and dealing with deep tectum through the extensive survey, research, design, and construction in Gongzui and Tongjiezi. To date, the Chengdu Survey and Design Institute has completed 100,000 meters of drillings, 10,000 meters of tunnel survey, and a large amount of geological work. A basic understanding has been obtained for the geological structure of the region and for the thickness distribution and layered structure of the riverbed coverage. This information formed the basis for cascade selection and for near-term construction.

(III) The primary goal in the integrated development of the main branch of the Dadu River is hydroelectric power, as supplemented by floating logs, preventing floods, and improving navigation and irrigation.

Hydroelectric power: The Dadu River is centrally located geologically. The area of the river valley above Tongjiezi is 76,400 square kilometers, the annual run-off is 47 billion cubic meters, the water supply is rich and the flow during the low water season is stable. From Shuangjiangkou to Tongjiezi, the length of the main branch is 593 kilometers. The usable waterhead is 1,773 meters, the total generator capacity of the planned cascade is 18.06 million kW, and the annual output will be 100.8 billion kWh. At the present time, the hydroelectric power resources are poorly used and Sichuan lacks coal resources. According to the mid- and long-term electric power development plans of Sichuan Province, the rich water resources of the Dadu River must be developed as soon as possible in order to meet the increasing need for electric power in Sichuan.

Log transport: The river valley of the Dadu River is one of Sichuan's major forest and lumber production bases. The forest area is 910,000 hectares and the total forest reserve is 240 million cubic meters. The lumber is transported primarily through the river. The float distance is about 800 kilometers and the historical high of the transport volume is 1.54 million cubic meters. The volume dropped down to 967,000 cubic meters in 1980 and there were further decreases in recent years. The long-term planned transport volume of the forestry department is 1 million cubic meters per year. The problem of floating logs over the dam must be properly solved in developing the Dadu River.

Flood prevention: A flood prevention reservoir on the Dadu River will have minimal flood control effects on the middle and lower reaches of the Chang Jiang. For cities and villages along the upper and middle reaches of the Dadu River, there is no need for flood because the farming lands are high. In the lower reaches, Leshan is located at the intersection of three rivers: the Dadu River, Qingyi Jiang, and Min Jiang. The Qingyi Jiang is located in the storm zone of Emaishan and frequently has large floods; therefore, it is the major flood threat for Leshan. Flood water in the Min Jiang and Dadu rivers also affects the flood control of Leshan. In the plan, 600 million cubic meters of reservoir space is reserved in each of the two large modulation reservoirs at Dusong and Pubugou to alleviate the flood threat to Leshan.

The flood prevention standards of the reinforced power plant buildings of the Gongzui hydropower station can only guard against once-in-200-years flooding because of the raised water level downstream. When the Pubugou station is completed, the flood retaining effect of its reservoir will improve the flood prevention standard of the Gongzui plant building to once-in-500-years flooding.

Navigation: The transportation department has built a grade-five navigation channel between Shawan and Leshan to the lower reaches of the Dadu River. The grade-four channel between Leshan and Yibin on the Min Jiang will be completed in 1990. The Tongjiezi station under construction will be able to provide counter modulation for the peak discharge at the Gongzui station and help the navigation downstream. When the Pubugou station is built, the reservoir-modulated flow of the low water season will be increased to 650 m^3/sec, which will greatly help the navigation downstream. From Tongjiezi up the Shuangjiangkou, the navigation will be in the reservoir zone.

Irrigation: Based on the agricultural plan, the high plains area in the upper reaches of the Dadu River is mainly an area for ranching. The upper and lower reaches of the Dadu River have high mountains and deep valleys; the farming lands are sparse and scattered, and the water supply comes mainly from the tributaries. For the lower reaches of the river, the general plan of the Sichuan provincial water resources calls for a project to divert the water in the west to the east. This project will take the water in the Qingyi Jiang and supplement it with water from the Dadu River. Since the water will be taken from the lower reaches of the river, the effects on hydroelectric power will be minimal.

In terms of environmental impact, the construction of the cascade power stations on the Dadu River will have more

benefits than disadvantages. An outstanding problem is the effects of population relocation in the reservoir zone. This problem must be treated carefully and solved properly.

(IV) The Dadu River development plan calls for a cascaded development of the main branch at Dusong, Dagangshan, Pubugou, and Gongzui. Some of the cascades have the drawback of having a small reservoir, a tall dam, and a large flooded area. Some regions will require further investigation for geological stability. If necessary, a low lock diversion model may also be investigated from some of the river sections with steep slopes. Therefore, further adjustment of the plan may be made for some of the cascades after more work.

Along the Dadu River are mostly tall mountains and canyons; the drop of the riverbed is also steep. These conditions make it more difficult to obtain adjustment reservoir capacity by building dams. Along the river, only Jinchuan in the upper reaches and Hanyuan in the middle reaches have a broader river valley, where more reservoir capacity may be obtained by building tall dams. The two modulation reservoirs at Dusong and Pubugou are the controlling projects on the main branch of the Dadu River.

Dusong is located in the Jinchuan basin in the upper reaches; it controls 55 percent of the river valley area of the Dadu River and 35 percent of the annual run-off. The preliminary plan calls for a normal reservoir water level of 2,310 meters and a total reservoir capacity of 4.96 billion cubic meters. The effective reservoir capacity is 2.68 billion cubic meters and may be used for seasonal modulation. Pubugou is located in the Hanyuan basin in the middle reaches of the river. It controls 94 percent of the river valley area and 90 percent of the annual run-off. The normal reservoir water level is 850 meters, while the total capacity is 3.87 billion cubic meters and seasonal modulation is available. Without the modulation of large reservoirs, the guaranteed total output of the cascades is only 3 million kW. With only one reservoir at Dusong, the total guaranteed output of the cascades will be raised to 6.3 million kW. With the Dusong reservoir, a tall dam at Pubugou (as opposed to a low dam) will increase the short-term guaranteed output by more than 1 million kW of the completed cascades and cascades under construction downstream. In order to make proper use of the water resources of the Dadu River, it is necessary to build the reservoirs at Dusong and Pubugou and the benefits are quite obvious.

The river section from Dagangshan to Tongjiezi is located near load centers and has good accessibility. A fair amount of front-end work has already been done for this section and the riverbed coverage is relatively small. The technology required for this river section is basically within the domestic level. The five major cascade power stations are: Dagangshan, Longtoushi, Pubugou, Gongzui, and Tongjiezi, with a guaranteed output of 2.35 million kW when operated jointly. The generator capacity is 7.96 million kW, and the annual output is 39.2 billion kWh. These are superior targets. We, therefore, recommend that the early phase development of the Dadu River be placed on the river section between Dagangshan and Tongjiezi.

We recommend the increase in dam height at Pubugou and Gongzui as near-term projects and recommend Pubugou as a preferred candidate for the first phase construction. The geological structural stability of the Dagangshan region should be further investigated. Efforts should be spent on the early phase work to raise the height of Gongzui to prepare for the construction. The economic indicators of the cascade hydropower stations are listed in the table.

Economic Indicators of Cascade Hydroelectric Power Stations on the Dadu River

Name of power station	Site location	Area of river valley (km^2)	Average flow (m^3/s)	Normal water level (m)	Maximum head (m)	Total volume of reservoir ($10^8 m^3$)	Generator capacity (10^4 kW)	Guaranteed output (10^4 kW)	Annual output (10^8 kWh)	Loss due to flooding		Construction volume		Total investment (10^8 yuan)	Remarks
										Farmland (mu)	Population	Earth and rock work ($10^4 m^3$)	Concrete ($10^4 m^3$)		
Dusong	Jinchuan Xian, Sichuan Province	41,284	531	2,310		49.6	136	50.0 53.2	68.4 70.1	11,370	15,255	4,988.1	134.6	32.7	Single Combined
Manai	Jinchuan Xian	42,382	550	2,092		1.7	30	5.3 13.9	16.0 18.1	2,851	1,616	480.2	55.1	6.0	Single Combined
Jijiahe Dam	Danba Xian	53,100	727	2,040		20.0	180	34.8 78.6	95.8 109.6	12,370	24,358	7,510.0	140.0	42.1	Single Combined
Houziyan	Kangding Xian	54,968	778	1,800			140	27.1 58.2	73.9 83.5	995	601	3,040.0	80.0	23.8	Single Combined

Economic Indicators of Cascade Hydroelectric Power Stations on the Dadu River (Continued)

Name of power station	Site location	Area of river valley (km^2)	Average flow (m^3/s)	Normal water level (m)	Maximum head (m)	Total volume of reservoir ($10^8 m^3$)	Generator capacity (10^4 kW)	Guaranteed output (10^4 kW)	Annual output (10^8 kWh)	Loss due to flooding		Construction volume		Total investment (10^8 yuan)	Remarks
										Farmland (mu)	Population	Earth and rock work ($10^4 m^3$)	Concrete ($10^4 m^3$)		
Changhe Dam	Kangding Xian	56,545	815	1,630		6.0	124	25.5 53.2	68.0 76.2	105	57	2,650.9	77.5	20.3	Single Combined
Lengzhuguan	Kangding Xian	58,675	890	1,475		6.2	90	18.5 39.3	49.1 55.4	2,575	5,394	2,240.0	81.0	16.2	Single Combined
Luding	Luding Xian	58,943	890	1,370		2.8	60	12.3 26.1	32.8 36.9	810	180	860.0	60.0	12.6	Single Combined
Yinglangbao		58,943	890	1,250			110	21.4 43.9	58.3 65.5	3,060	1,500	2,380.0	90.0	19.8	Single Combined
Dagangshan	Shimian Xian	62,727	1,060	1,100		4.5	150	34.3 59.4	81.2 89.7	974	506	572.7	524.5	18.3	Single Combined
Longtoushi		64,727	1,060	955		1.2	50.0	11.4 23.2	28.00 31.30	477	639	564.0	57.1	6.80	Single Combined
Laoyingyan	Shimian Xian, Sichuan Province	64,810	1,130	905			60.0	12.7 23.3	31.90 35.00	2,510	4,172	590.0	55.0	9.20	Single Combined
Pubugou	Hanyuan Xian, Sichuan Province	68,500	1,230	850	178.5	52.5	330.0	88.2 91.8	141.50 144.30	38,000	62,000	4,285.0	256.0	39.98	Single Combined
Shenxigou		72,653	1,340	650			36.0	7.9 19.4	19.80 23.40	None	None	225.0	55.0	6.20	Single Combined
Zhentou Dam		72,653	1,340	623			44.0	9.7 23.7	24.10 28.70	None	None	270.0	95.0	7.50	Single Combined
Gongzui	Leshan	76,130	1,490	520/ 528 590	55.3 113.0	3.1 19.0	70.0 205.5 (Final)	17.9 43.2 83.4	34.18 101.00 104.80	3,700 11,006	4,105 27,617	277.3 263.0	154.6 350.0	4.92 20.70	Completed Single Combined
Tongjiezi	Leshan	76,400	1,490	474		2.0	60.0	13.0 33.2	32.10 37.10	4,304	5,886	678.2	271.1	11.50	Completed Under construction Combined
Total							1,805.5	723.8	1,009.60						

Construction Progressing Well on Huge Geheyan Project

92P60266 Beijing JINGJI RIBAO [ECONOMIC DAILY] in Chinese 16 Apr 92 p 1

[Text] On the richest tributary in the Chang Jiang drainage basin—the Qing Jiang—a massive water conservancy key project will soon be completed. This is the Geheyan hydroelectric power station, a major item on the State Seventh 5-Year Plan's 20 priority projects. The hydropower station will have a total installed capacity of 1.2 million kilowatts and a reservoir capacity of 3.4 billion cubic meters—twice that of the Gezhouba reservoir. The station will generate some 3 billion kWh of electricity a year and the first of its generators is expected to be operating in 1993. The dam is 151 meters high and its diversion tunnel is 672 meters in length—the longest in Asia.

Work Begins on Shanghai's 360MW Waigaoqiao Plant

926B0067B Shanghai WEN HUI BAO in Chinese
28 Dec 91 p 1

[Text] Work has begun on Shanghai's Waigaoqiao power plant, and yesterday the first foundation pilings were put in. With the largest thermal capacity in the country, this power plant has a design total installed capacity of 3.6 million kilowatts, and is being built with joint funding from the National Energy Investment Company, the Shanghai Shenneng Power Development Company and the Shanghai Power Industry Bureau.

The [capacity of the] plant's first phase of construction will be 1.2 million kilowatts and will involve the installation of four 300,000-kilowatt coal-fired units manufactured with foreign technology. With hard work, the No. 1 unit will be sending power to the grid by the end of 1994. The first stage of construction is scheduled to be completed and go into production at the end of 1997, and a year later power generating capacity could reach 8 billion kilowatt-hours.

Energy Ministry Proposes Ways To Check Decline in Coal Production

40100048 Beijing RENMIN RIBAO in Chinese 5 May 92 p 2

[Article by reporter Liu Xieyang [0491 3610 7122]]

[Excerpt] Local coal output, which makes up more than 50 percent of the national coal output, begins to decline. What is to be done? Vice Minister of Energy Hu Fuguo said: The methods for solving this problem are to deepen reform, change the operational mechanism, raise funds through various channels, increase momentum for future development, and promote production.

China's local coal output reached 575 million metric tons last year, which is 7.52 million tons less than the previous year. But the output of the first 2 months of this year was 7.99 million metric tons less than the same period last year. The main reason for the decline is the lack of momentum for future development and the infirm foundation, though there is also a weak coal market.

Hu Fuguo said: This situation should arouse sufficient attention. We must adopt effective measures to prevent further decline.

— To raise funds through various channels and increase input. The coal industry is a fund-intensive type industry which demands large fund input. Because of its long construction period and slow recovery of funds, and in addition, the coal price is on the low side at present, both the state and local finance units must continue to support it with considerable funds. At the same time, it is necessary to find more channels to raise funds so the input can be increased. Over the past few years, many provinces and regions have adopted a development fund collecting policy. It should be further standardized to ensure collection. Meanwhile, a reasonable level of profits retained by the coal enterprises must be maintained. Moreover, the coal enterprises must diversify the sources of their construction funds by various means, such as introducing foreign funds, obtaining bank credit, issuing bonds, carrying out coordinated operation, buying shares, having some shares held by the workers, selling coal to raise funds, and promoting compensation trade.

— To rely on science and technological progress to change the backward situation. At present, it is necessary to pay attention to the following: to improve coal cutting methods, develop coal extraction machinery, improve safety and gas prevention projects, and extensively absorb science and technological and operational personnel and improve their quality. [passage omitted]

Large-Scale Development of Eastern Ningxia Fields

926B0077 Beijing LIAOWANG ZHOUKAN [LIAOWANG WEEKLY] in Chinese No 10, 9 Mar 92 pp 16-17

[Article by Tian Shubin [3944 5289 2430]: "Ningxia In Large-Scale Development of Eastern Ningxia Coal Fields"]

[Text] Ningxia, which has for years consistently shipped coal out of the province, has extremely abundant resources. The autonomous region as a whole covers an area of more than 60,000 square kilometers and has proven coal reserves of more than 30 billion tons, fifth place in China. Combined with the fact that the coal is of superior quality and that most of it is high-quality power coal which is in short supply in markets in China and foreign countries, and its substantial coal production foundation, Ningxia has been made one of five key coal base areas in China's National Economic and Social Development 10-Year Program and Eighth 5-Year Plan.

According to the Program, the old Helanshan coal region in northern Ningxia, which produces more than 13 million tons of raw coal each year, will exploit potential and be upgraded. In central Ningxia, there will be large-scale development of Ningdong [East Ningxia] coal field and the focus during this century will be on construction of Lingwu Mining Region.

I. Huge Coal Mines

East Ningxia coal field is located at the western edge of China's biggest region of abundant energy resources. It has proven coal reserves of 27.3 billion tons and accounts for more than 80 percent of Ningxia's total reserves.

Ningxia's superior quality anthracite coal, most of it "Taixi coal", occupies a unique status in our national economy. For this reason, the local government has always made coal development a focus of economic development in Ningxia. Geological exploration of the East Ningxia coal field began in the late 1970's. The idea of making a strategic shift westward in coal base area construction was born when the state announced an energy resource shortage. Ningxia immediately focused on the proven reserves in this big coal field and attracted the attention of the State Unified Distribution Coal Mine Corporation and Ministry of Energy Resources.

East Ningxia coal field has both abundant reserves and excellent basic development conditions. The coal field has stable reserves, the coal seams have an average thickness of 22 meters, and there is little gas. It has a development and exploration history covering more than 1,000 years since the Western Xia regime [1038-1227]. The coal here is characterized by low ash, sulfur, and phosphorous contents, high heat value, high chemical activation, and high mechanical strength. It is better than Datong and Shenfu coal and is superior quality power coal and coal for use in oxygenation. Based on the resource conditions of Ningxia's large coal reserves and nearness to the Huang He, the former state Ministry of Water Resources and Electric Power originally planned to establish a thermal power base area for the Northwest China Grid in the area south of Yinchuan with a total scale of 10 million tons.

In August 1989, former state Ministry of Coal Industry minister Yu Hong'en [0060 3163 1869] felt after a personal visit to Lingwu Mining Region that the development of Lingwu Mining Region would be of major significance for the coal required to guarantee an additional doubling [of the gross value of industrial and agricultural output] in the national economy. From the long- term development perspective, it has the conditions for building 30 million tons in coal production capacity and there is a great possibility that it

could be the fourth or fifth largest coal base area in China after Datong, Pingshuo, and Shenfu. He also pointed out that modernization is essential for such a large mining region.

As a result, modernization of this fulcrum in future coal industry development was included in the overall plan for initial development of East Ningxia coal field's Lingwu Mining Region that was approved by the state in September 1990. According to the "three-step" strategic principle for mining region construction, the first phase investment will be 2.556 billion yuan. Lingxin Coal Mine with a yearly output of 2.4 million tons will be completed during the Eighth 5-Year Plan and construction will begin on Yangchangwan Mine, which will have a yearly output of 3 million tons. Yangchangwan Mine will be completed during the Ninth 5-Year Plan and construction will begin at Zaoquan Mine, which will have a yearly output of 5 million tons. By the early part of the next century, a huge modernized mining region with a yearly output of 11.6 million tons will have been built here.

II. Build Mines While Producing Coal

In the mid-1980's Lingwu Mining region had not been included among formal state projects, so the task of the newly-established Lingwu Mining Bureau was merely to make preparations. Nevertheless, accelerated construction of Daba Power Plant was a matter of the utmost importance. In dealing with this pressing situation, several old "coals" left the old mining regions in northern Ningxia which had stable output and came here, as did several young intellectuals who had just left the gates of their universities and colleges. With enthusiasm for construction, these two generations of people bearing high spirits entered the mining region. To adapt to the requirements of the situation, the builders established the principle of "one-time design, phased construction, starting with small mines, concentrating large mines, producing coal ahead of schedule".

This was a development model never before seen in the history of coal construction in China. In 1987, the former Ministry of Coal Industry approved the inclusion ahead of schedule of the start of construction at the No 1 shaft at Lingxin Coal Mine in Lingwu Mining Bureau in the national unified distribution mine plan. With a desire to produce coal quickly, the mining bureau devised ways to raise capital and used their own forces to build the No 2 shaft at Lingxin Mine. Although the 70 kilometer dedicated railway line, power transmission facilities, and water supply projects in the mining region had just moved from the design phase to the start of construction, they applied this model and relied on the existing simple and crude water, electricity, and roads of local mines. At the time that the initial preparations in the mining region were concluding satisfactorily at the end of 1990, they completed two unified distribution mines with a yearly production capacity of 750,000 tons and began producing coal.

Apparently, construction of the second phase project at Lingxin Coal Mine will begin in 1992. Construction of the No 1 shaft at Yangchangwan Coal Mine has begun and it may provide an additional 3.6 million tons in coal production capacity by the end of the Eighth 5-Year Plan. The design for Lingxin Coal Mine adopted the "three comprehensives and one high", referring to the integration of three fully mechanized mining work faces with a high-grade excavation work face to achieve haulage by conveyor and automated control. This was an indication that the entire mining region will be built according to modernized standards into a modern mining region that uses few people, is highly efficient, and has reliable safety facilities, good economic results, and a comfortable and beautiful environment.

III. Promote Optimized Deployments in the Industrial Structure

Over 78 percent of the railroad transportation capacity on the only railroad passing through the borders of Ningxia is busy all year hauling coal to other provinces. People in economic circles feel that building Lingwu Mining Region into a huge coal base area is an advantage, but this advantage must be converted locally before economic results can be improved substantially. It is precisely this type of concept that has promoted optimized deployments of the industrial structure.

In the near term, Lingwu coal will mainly be converted to a secondary energy resource: electricity. To foster its resource advantages and build Daba Power Plant, which will have the largest installed generating capacity in the northwest China region with a design capacity of 2,400MW, the tall heat reaction towers and plant buildings for the first phase of the project are now rising from the wilderness. After the operationalization of the first 300MW generator in 1991, the second generator may be completed and begin generating power by the end of 1992. The State Planning Commission has also approved an investment of 1.1 billion yuan during the Eighth 5-Year Plan for continued construction of two 300MW coal-fired generators for the second phase project at this power plant.

The secondary energy resource electricity will plant wings on the high energy consuming raw materials industry. The second phase 50,000 ton electrolytic aluminum expansion project at Qingtong Gorge Aluminum Plant near the power plant has passed state examination and acceptance and the third phase 100,000 ton electrolytic aluminum expansion project has been included in the state's Eighth 5-Year Plan. Ultimately, the electricity from Daba Power Plant will be used to complete a 180,000 ton scale of electrolytic aluminum by 1995, making it China's biggest electrolytic aluminum production base area.

With the electrification and upgrading of the Bao-Lan [Baotou-Lanzhou] Railroad and completion of the Bao-Zhong [Baoji-Zhongwei (or Zhongning)] Railroad in 1995, which will open a steel road linking Ningxia to the Long-Hai [Lianyungang-Lanzhou] Railroad, there is no doubt that development of the coal resources of Lingwu Mining Region will not only be an important state integrated coal, electricity, and aluminum base area but will also become an important state coal supply base area and play a huge traction and radiation role on the national economy in northwest China and Ningxia.

To coordinate with coal field development and connect the capital of Ningxia Hui Autonomous Region with the grade 1 Yin-Gu [Yincchuan-Guyaozi] Highway in the mining region, development of the large Huang He bridge in Yinchuan and other key construction projects will begin.

Foreign Oil Companies Seek Offshore Oil Exploration, Development

40100045A Beijing CHINA DAILY [ECONOMICS AND BUSINESS] in English 6 May 92 p 2

[Article by Zheng Caixiong: "Investors Plunge Into Offshore Oil"]

[Text] Shenzhen—Foreign oil companies are seeking more co-operation with Chinese firms to explore and develop offshore oilfields in the South China Sea.

More than 30 foreign oil companies are committed to exploring and developing oilfields in the area, said Zhang Wunian, vice-president of Nanhai East Oil Corporation (NHEOC).

These companies, which are from 10 countries and regions, signed a total of 30 contracts and agreements and invested nearly $1.2 billion by the end of last year. They include Amoco, Phillips, Esso, Shell and Agip.

South China Sea has so far taken the lion's share in foreign investment in offshore oil development. About 80 percent of such contracts signed by overseas companies in China are located here.

"More negotiations are now underway for new exploration and development in the future," Zhang said.

Nine oilfields, with 390 million tons of oil deposits, have been discovered. Commercial development will start in the next few years, Zhang told CHINA DAILY.

An estimated total of $2.3 billion is needed to develop all the nine off-shore oilfields.

Two oilfields have started production. The Huizhou 21-1 and Huizhou 26-1 produced a total of 1 million tons of crude oil in the first 4 months this year.

The combined production capacity of the two oilfields will reach 2.05 million tons by the end of this year.

The two offshore oilfields were jointly developed by NHEOC, a subsidiary of the China National Off-shore Oil Corporation (CNOOC), and ACT Operating Group consisting of the Agip (Overseas) Ltd. of Italy, the Chevron Overseas Petroleum Company and Texaco Petroleum Maatschappij (Nederland) BV Company.

J. L. Hawkins, financial manager of the ACT group, said: "China is trying its best to move away its obstacles and protect the foreign investors."

ACT is considering developing another two oilfields, Huizhou 32-2 and Huizhou 32-3, in the years ahead, Hawkins said.

Meanwhile, Lufeng 13-1 (LF13-1), with an oil deposit of 25.32 million cubic meters, is scheduled to start operation in August next year. The field is jointly developed by the NHEOC and JHN oil group of Japan.

Minoru Kuraishi, president of the JHN group, said 75 percent of the total $200 million investment came from the Japanese oil firms.

Japanese JHN group consists of Japan Petroleum Exploration Company Ltd., Luanan Oil Development Company Ltd. and Nippon Mining Company Ltd.

And in 1994, two new oilfields, the Xijiang 24-3 and Xijiang 30-2, are scheduled to start production.

The two oilfields are jointly developed by the NHEOC, Phillips Petroleum International Corporation Asia and Pecton Orient Company of the United States.

The NHEOC accounted for 51 percent of the total investment of $600 million for the two fields.

Meanwhile, C. M. Tsang, vice president and resident manager of Phillips said the company is seeking further co-operation with NHEOC in exploring and developing off-shore oilfields in the South China Sea.

Sichuan's Natural Gas Production Hits All-Time High

926B0066C Chengdu SICHUAN RIBAO in Chinese 9 Feb 92 p 1

[Article by Hu Depei [5170 1795 3099]: "Sichuan's Natural Gas Production Hits All-Time High"]

[Text] As we ring in the new year, good news arrives from the petroleum production front in Sichuan. In the first year of the Eighth 5-Year Plan, Sichuan produced 6.48 billion cubic meters of natural gas. It exceeds the 1979 production record and hits an all-time high.

In 1979, Sichuan produced 6.47 billion cubic meters of natural gas. Since then, due to difficulty in prospecting and lack of capital, as well as inadequate support in science and technology, natural gas production fell. In recent years, the Sichuan Petroleum Bureau developed an early stage prediction method from studies on the unique geological characteristics of the multi-layer low-permeability basin to select well sites and structures. In addition, the engineering design for well drilling was tightened up. Drilling speed and well quality were improved. Side-drilling and horizontal-drilling techniques were developed to improve the probability of hitting gas pockets and to increase productivity. Last year, the bureau devoted its efforts to quality, variety and profitability. The main thrust was focused on the success rate for prospecting and final collection rate. The bureau drilled 33 prospecting wells and 18 hit natural gas pockets, for a success rate of 54.5 percent. The new discoveries include four gas-containing structures and six gas reserves. According to a preliminary estimate, the known reserve is 16.2 billion cubic meters and controlled reserve is 27.5 billion cubic meters, corresponding to 115 percent and 172 percent of the annual plan, respectively. The new technologies and techniques developed were used to enhance the yield in over 400 wells. It was effective for over 100 wells and resulted in an increase of 200 million cubic meters of natural gas which significantly improved the final collection rate.

Domestically Produced Pressure Vessel Will Be Used in Qinshan Expansion

926B0066A Beijing JINGJI RIBAO [ECONOMIC DAILY] in Chinese 17 Feb 92 p 2

[Article by correspondent Li Jiangtian [2621 3068 1131]: "Nuclear Power Plant Pressure Vessel Material Developed"]

[Text] After 10 years of work, we have successfully developed the technology required to manufacture the pressure vessel material for nuclear power plants. Thus, China joins countries such as the U.S., U.K., Japan and Germany that control the production of this type of material. It is an important step toward independent construction of domestic nuclear power plants.

Pressure vessels and fuel elements are the key technical issues concerning a nuclear power plant. The control of production technology for pressure vessel materials is a key milestone to reflect the degree at which a country can construct nuclear power plants independently. Until recently, only a few developed nations had access to this technology. It was a void to be filled domestically. The pressure vessels used at the Qinshan Nuclear Power Plant (Phase I) and the Dayawan Power Plant, which is under construction, were imported from Japan and France at a cost of several million dollars.

A technical task force was formed by the Second Heavy Machinery Corporation of the Ministry of Machine Building, China Design Institute of Nuclear Power, the Institute of Iron and Steel of the Ministry of Metallurgy, and Harbin Institute of Welding of the Ministry of Metallurgy in 1981 to study the steel and welding materials used in the pressure vessels. It involved in-depth research, delicate design and scientific processing and repeated testing. After 10 years of dedicated effort, it is a success. The fact that China could not produce this special material became a part of history. Experts pointed out that it was not until the 1980's that the U.S. completed the development of pressure vessel materials for medium and large size nuclear power plants, and the work actually began in the 1950's. It took us only 10 years to go through this process which took the U.S. 30 years to complete.

An assessment meeting was held a few days ago at Deyang, Sichuan by the Ministry of Machine Building and Ministry of Metallurgy. Experts unanimously agreed that domestically produced pressure vessels are excellent in quality. Specifications such as strength, plasticity, impact resistance, reserve capacity and radiation characteristics are at advanced levels in the 1980's. They are safe and reliable. All pressure vessels for nuclear power plants can be produced domestically. This major technical breakthrough will significantly accelerate the pace toward complete independence in the construction of nuclear power plants. It will also drastically reduce the construction cost of such plants.

Domestically produced reactor pressure vessels will be used in the construction of the 600 MW (Phase II) reactor at Qinshan.